Magnum in Parvo,

OR, THE

PRACTICE

OF

Geometry

WITH

A New Order and particular Method thereof.

Wherein is Contained

EXAMPLES of *Landskips*, Pieces of *Proſpective*, and the like: Repreſented by Eighty two Plates; Each Plate having a full Deſcription.

Publiſh'd in Engliſh by R. P. *for the Lovers of* ART.

Licenſed, Aug. 30. 1670. Roger L'eſtrange.

LONDON,

Printed for *Robert Prick* in *White-Croſs-ſtreet*, over againſt the *Croſs-Keys*: and the *Golden Lyon*, at the Corner of *New-Cheapſide* next *Bethlem*: Where you may have Choice of other Books of *Architect*: alſo *copy-Books*, *Italian and Dutch*.

Prints. 1671.

TS8C-150

Of Geometry in General.

EOMETRY *is a Greek word, which in its proper ſignification telleth us of no other thing, then Meaſuring of the Earth; Nevertheleſs by this word we are to underſtand the Principal Part of the* Mathematicks, *which is a Science that hath for its Object Quantity continued.*

A continued Quantity is that, whereof all the Parts are joyned together, as are all ſorts of Extenſions, of Greatneſs, and of Dimenſions.

And theſe Dimenſions conſiſt principally, either in Lynes, or in Angles, or in Superficies, or in Bodies, which are to be conſidered, not according to the Quality of the Matter, but only according to the Extenſion of the Parts.

Geometry *is divided into the Theorick, and the Practick; the Theorick is the Science, which cauſeth us to conceive and demonſtrate the truth of Geometrical Propoſitions;*

ons; And the Practick is the Art, which guideth the Hand in its Operation.

Geometry *had its beginning among the Egyptians, which were compelled to invent it, for to remedy the diſorder that hapned ordinarily within their Grounds, by the overflowing of the River* Nilus, *which carried away all the Bounds, and defaced all the Limit-Marks of their Inheritances: and ſo this Exerciſe, which for the time conſiſted only in Meaſuring the Lands, for to render to every one that which belonged to him, was called the Meaſuring of the Earth, or Geometry: But in proceſs of time the Egyptians applied themſelves to more ſubtile Enquiries, and by degrees from an Exerciſe altogether Mechanical, they brought forth this excellent Science, which hath deſerved to hold one of the chiefeſt Ranks amongſt all others.*

Geometry *is not only profitable, but one may ſay that it is altogether neceſſary: It is by this that the Aſtrologians do make their Obſervations; by it they know the Extent*

Extent of the Heavens, the Duration of Times, the Movings of the Stars, the Regulating the Seaſons of the Years and of the Ages.

It is by this means, that the Geographers do cauſe us to ſee at one caſt of an eye the Greatneſs of the whole Earth, the huge Extenſion of the Seas, the Diviſions of Empires, of Kingdoms, and of Provinces.

It is from this, that the Architects do take their juſt Meaſures in the framing of the publick Buildings, as well as of particular houſes..

It is by the help of this the Engineers do bring to paſs all their intended Projects, whereby they take the Scituation and Platform of Fortifications, the Diſtance of Places, and that they can at length carry their Meaſure, through ſpaces acceſſible only to the ſight.

Perſons of Quality, whoſe Birth engageth them to the Wars, are obliged to apply themſelves to this Science. It introduceth them not only to Fortification, which

teacheth them to build Bulwarks, which defend ſtrong Places, as alſo to Compoſe and ſet up Engins, which may overthrow them; and further alſo it brings them very much knowledge and skill in the Military Art, how to ſet an Army in order for Battel, how to encamp and divide the Ground for the quartering; and further, it teacheth them to make Maps of Countreys, and to take the Platform of Towns, of Forts, and of Caſtles, to meaſure all kind of Dimenſions, both acceſſible and unacceſſible, to invent Projects; and laſtly, it maketh them ſo expert and commendable for their Wit and Inventions, as they can be for any ſtrength or couragiouſneſs in them.

All thoſe that make Profeſſion of entring upon Deſignes, ought to know ſomething of Geometry, ſeeing that they cannot otherwiſe attain the Art of Architecture, nor Perſpective, which are two Parts abſolutely depending on that skill.

The

THE PRINCIPLES OF GEOMETRY.

The Principles of GEOMETRY.

GEOMETRY is eſtabliſhed upon three ſorts of Principles, *viz.* Definitions, Axioms and Petitions.

The Definitions are brief Explications of the Names and Terms.

The Axioms are ſentences ſo true, and ſo manifeſt, that it is impoſſible to contradict them.

And the Petitions are clear and intelligible Demands, whereof the Execution and Practice requireth not any Demonſtrations.

THE

THE DEFINITIONS.

The Definition of a Point.

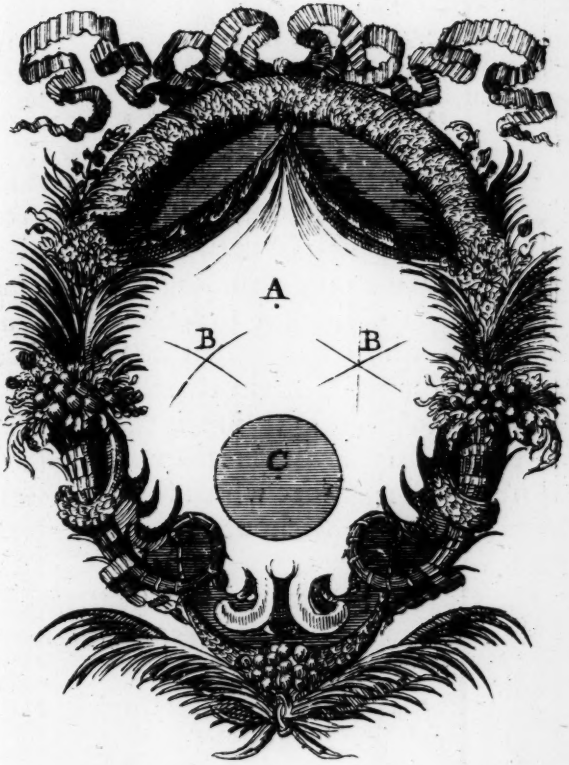
THE Point is that which hath not any Part.

By this Definition, it is easie to conceive, that the Point hath neither length, nor bredth, nor depth, and that also it is not sensible, but only Intellectual, seeing that there is nothing which falleth under sense, which hath not a quantity, and that there is no quantity without Parts, which would altogether contradict this Definition. Nevertheless, as none can make any Operation, but by the Interposition of corporal things, they represent therefore the Mathematical Point by the Point Physical, which is the Object of the sight, the smallest and least sensible, which hath no Geometrical Greatness, divisible to our sense, and is made with the Point of a Needle, or with the end of the Point of the Compass of a Pen or Pensil, as the Point noted by *A*.

The Point Central or Center, is a Point by which a Circle is drawn, or a Circumference, or rather it is the midst of a Figure, as *C*.

The Point secant, is a Point where the Lines do interdivide themselves, and which is ordinarily called a Section, as *C D*.

The


A
B
B
C

The Definition of a LINE.

THe LINE is a length without bredth.

The *Line* is no other thing then the paſſing of the Point from one place to another, and it would be unperceivable if one ſhould not ſet it forth by the Point Phyſical, the which by its flowing, doth repreſent to us, as *A B*, *C D*, *E F*.

There are many ſorts of Lines, as the Point, which is the Original thereof, is able to receive different Motions; Nevertheleſs, they take into conſideration only two ſingle and principal ones; the Streight and the Crooked; and a third alſo, which they call the Mixt, becauſe that it is Compoſed of the two firſt.

The right or ſtreight line is that which is equally comprized within its extremities.

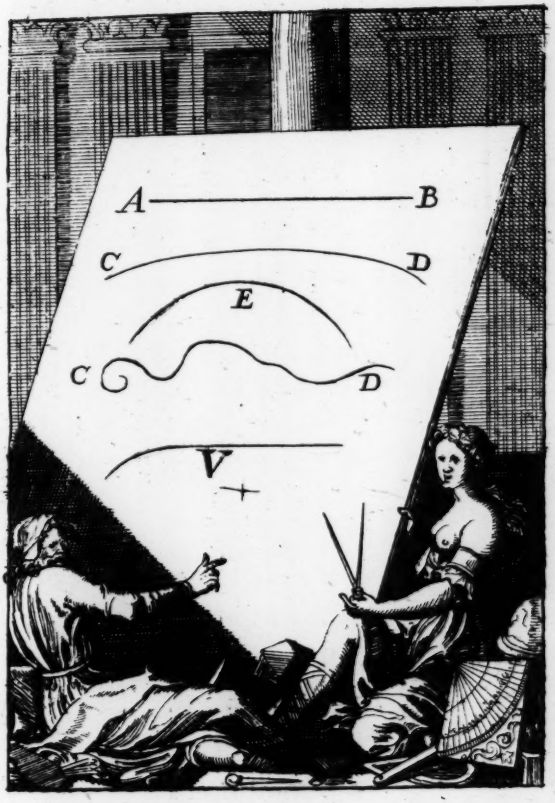
Otherwiſe it is that which floweth from one Point to another without any turnings aſide, as *A B*.

The Crooked Lyne is that which turneth or wandreth from its Extremities, by one or more Turnings aſide, as *C D*.

Whenas this Line is deſcribed with a Compaſs, they call it Circular, as *E*.

The Mixt Line is that which is ſtreight and Crooked, as the Line V.

The


A
B
C
D
E
C
D
V

The LINE is distinguished into Finite and Infinite, into Apparent, and Occult or Hidden.

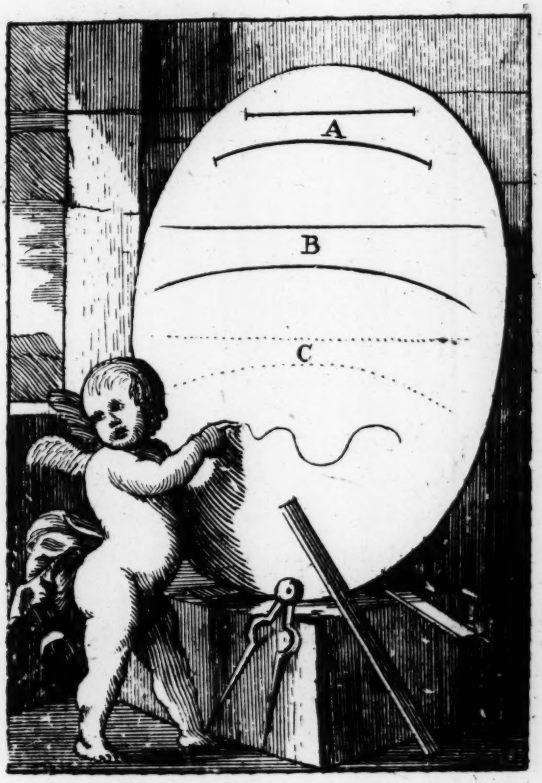
The Line Finite is a Line bounded, which conteineth or ſuppoſeth a length neceſſary, as *A*.

The Infinite is a Line undetermined, which hath no preciſe length, as *B*.

The Apparent or Traced out, is that which is deſcribed with Ink or Pencil, as *A B*.

The Occult or White, which is drawn only with the Point of the Compaſs, or marked with Points, and therefore they call it, the Pointed or Line with Points, *C*.

The


A
B
C

The Line receiveth alſo divers Denominations, according to its divers Poſitions and Proprieties.

A Perpendicular is a right Line, which falleth or lifteth it ſelf up upon another, maketh the Angles of the one part & the other equal between themſelvs, as *A B.*

A Plumb Line, is that which goeth from high to low without bending, either to the right or to the left, and which would paſs through the Center of the world, if it were prolonged infinitely, as *C.*

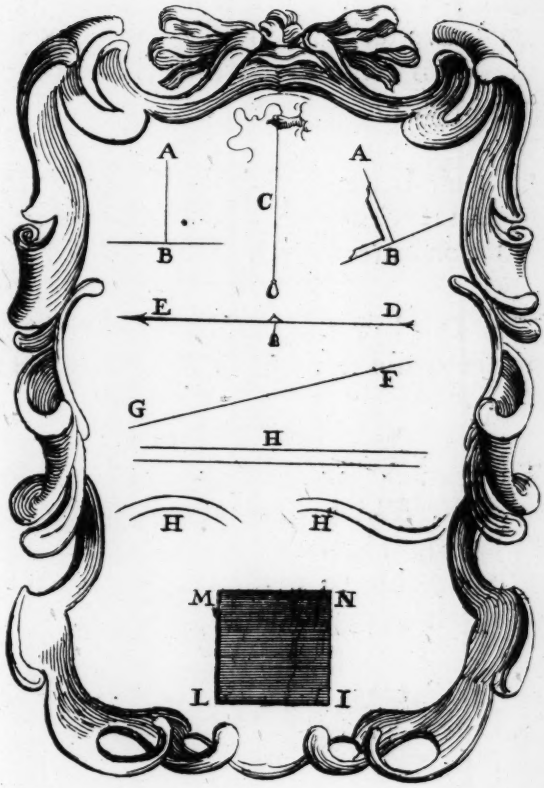
A Line Horizontal is a line in an equal poize, which inclineth it ſelf equally on the one part and the other, as *D E.*

Lines Parallels are thoſe which follow each other by an equal diſtance, as *H.*

An Oblique Line, which is neither Horizontal nor a Plumb-Line, but of a Byas, as *F.G.*

The Baſis is the Line, upon which the Figure repoſeth it ſelf, as *I L.*

Sides, are thoſe Lines which encompaſs a Figure, as *I N. N M.* The


A
B
C
A
B
E
D
F
G
H
H
H
M
N
L
I

THe Diagonal is a right Lyne that traverſeth a Figure, and that which Endeth at two Angles oppoſite, as *A. B.* The Diameter is a right Lyne which Traverſeth or paſſeth through a Circular Figure by its Center, and which Ends at the Circumference.

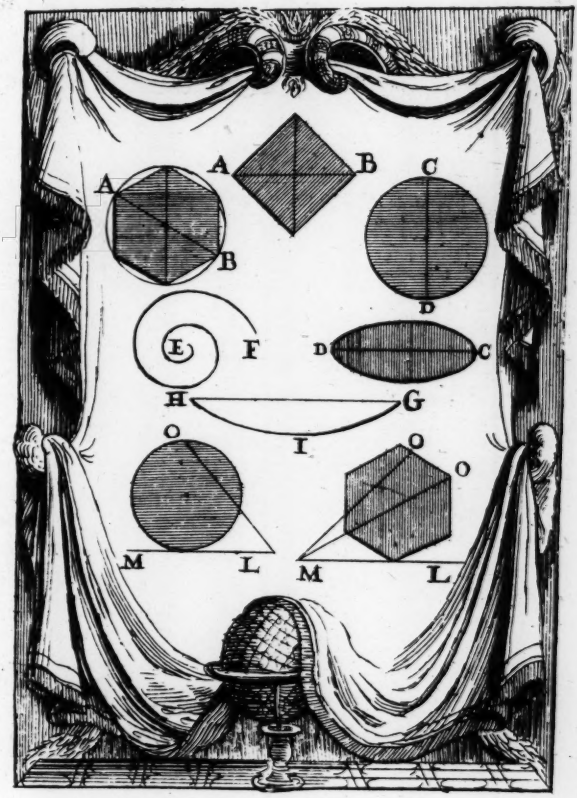
A ſpirall Lyne is a Crooked Lyne which parteth from its Center, and groweth further off in proportion as it turneth about, as E E.

The Cord or Subtendant is a right Line, which is joyn'd to an Arch or Bow by its Ends, as G. H.

The Arch or Bow is a Part of a Circumference, as G, I, H. A Line Tangent is that which toucheth any Figure, without dividing it, and without being able to divide or paſſe through it, although it were prolonged, as L, M.

A Line Secant, which Croſſeth, which divideth or traverſeth, as L, O. M, O.

The


A
B
A
B
C
D
E
F
D
C
H
G
I
O
O
O
M
L
M
L

The Definition of the Angle.

AN Angle is the indirect meeting of two lines at one and the ſame Point, or rather it is the ſpace encompaſſed between the indirect meeting or concourſe of two lines, joyning together in one Point, as A. B.C. When as this concourſe is made of two right lines, the Angle is call'd Rectilinear and when it is made of two crooked lines, it is called Curvi-linear, but when it is made of one right line, and one crooked line, it is called Mixtilinear.

A. The Angle Rectilinear.

B. The Angle Curtilinear.

C. The Angle Mixt-linear or Compoſite.

The Angle Rectilinear, according as it is more or leſs open, it receiveth particular denominations, as Right, Sharp, Obtuſe or Blunt: So that theſe Terms of Rectilinear, Curvilinear, and Mixt are in reſpect of the Quality of the lines, and theſe of Right, Sharp and Obtuſe, are in reſpect of the quantity of the ſpace incloſed within the ſaid lines.

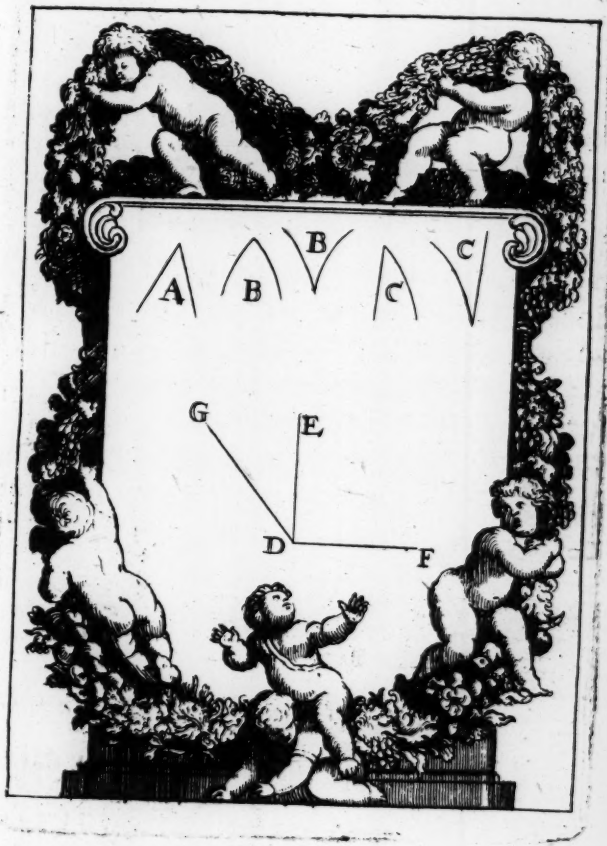
It is a Right Angle, when one of the Lynes is Perpendicular upon the other. E. D. F.

The Angle is ſharp, when as it is leſs open then the Right Angle, as E. D. G.

The Angle is Obtuſe, when it is more open, then the Right Angle, as F. D, G.

The Letter D. in the midſt ſheweth the Angle.

The


A
B
B
C
C
G
E
D
F

THE DEFINITION OF THE SUPERFICIES.

THe Superficies is that which hath length, and breadth without depth.

According to the Geometricians, the Superficies is a Production of the flowing forth of the line, as the line is a Production of the Point: and thus we muſt conceive that the line E F. flowing towards G H. doth make the Superficies E F G H. which is an extenſion bounded with lines, which hath nothing but length and breadth without any depth or thickneſs, which is called the Surface, or Figure, if one conſider it in reſpect of its extremities, which are the lines that encloſe it.

If the Superficies be on the upper part, it is called a Convex, if it be in inner, or hollow part, it is called a Concave, if it be plane and united, it is called a Plane.

B. *A Convex Superficies.*
C. *A Concave Superficies.*
A. *A Plain Superficies.*

The firſt part teacheth only the conſtruction, a framing of Plain Superficies.

A Term or Bound is the extremity of any thing: the Point is the Term or Bound of the line: the lyne is the term of the Superficies. and the Superficies is the Term or Bound of a Body.

Of

C
B
C
B
C
B
g
e
A
A
H
f

Of SUPERFICIES or FIGURES Rectilinear.

The Superficies do take particular Names, according to the number of their Sides, as,

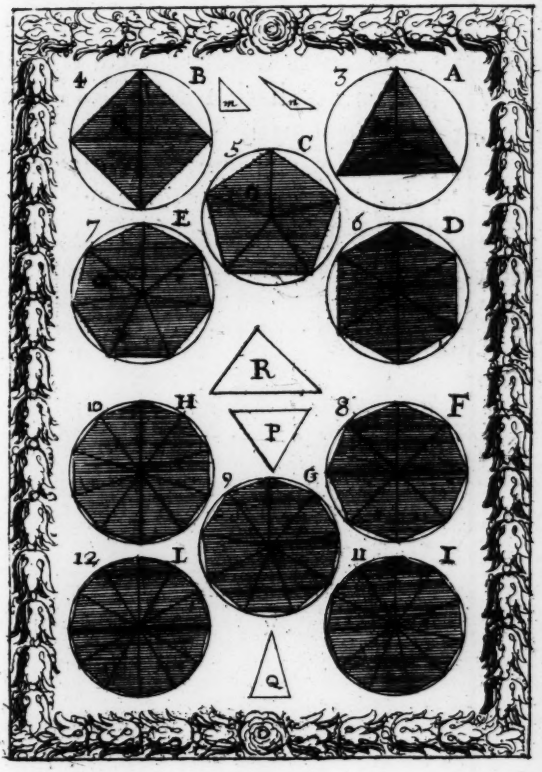
A. A Trigone or Triangle, figure of 3 sides.
B. A Tetragone or Square, figure of four sides.
C. A Pentagone, or figure of five sides,
D. An Exagone, or figure of six sides.
E. Eptagone, a Figure of seven sides.
F. Octogone, a figure of eight sides.
G. Enneagone, a figure of nine sides.
H. Decagone, a figure of ten sides.
I. Endecagone, a figure of eleven sides.
L. Dodecagone, a figure of twelve sides.

All these Figures are called likewise by one general name Poligones.

OF TRIANGLES.

The Triangles also are distinguished by the quality of their Angles, and by the disposition of their sides, as,

M. A Triangle Rectangle, which hath a Right Angle
N. A Triangle Ambligone, which hath an obtuse angle
O. A Triangle Oxigone, which hath three angles sharp
P. A Triangle Equilateral which hath its 3 sides equall
Q. A Triangle Iso sele, which hath two sides equall only
R. A Triangle Scalene, which hath his three sides unequall.


4
B
m
n
3
A
5
C
7
E
6
D
R
P
10
H
8
F
9
G
12
L
11
I
Q

OF FIGURES OF FOUR SIDES.

A. THe Square is a Figure compoſed of four equal ſides, and four right Angles.

B A Long Square is a Superficies Rectangle, that is to ſay, which hath its Angles Right, but hath not its ſides equal.

A B C. A Parallelo-gramme, is a Square ſide figure whereof the oppoſite ſides are Parallels.

D A Rhombus or Lozange is a ſquare ſide figure which hath the four ſides equall, but not the four Angles.

E. A Rhomboid which hath the Angles and the ſides oppoſite equal, without being equal-angled or equal ſided.

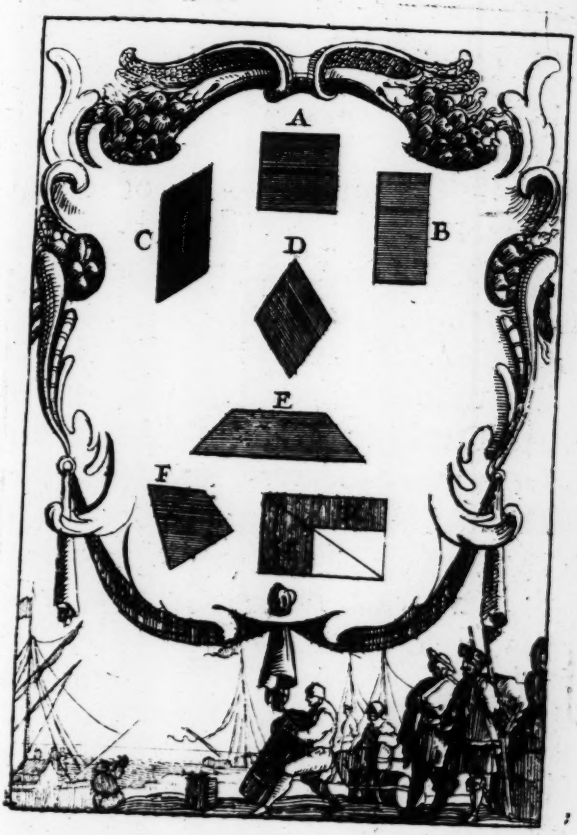
F. A Trapeze, which hath only two ſides oppoſite Parallel, and the other two equall.

G. A Trapezoide or Tablett, which hath its ſides and its Angles unequal.

H. A Gnomon is the exceſs of a Parallelo-gram upon another Parallelo-gram framed upon the ſame Diagonall.

All other Figures of more then four ſides are called by one general name Multi-latere, or Many ſi es.

O


A
B
C
D
E
F

Of Figures Crooked or Curvi-linear.

A. A Circle is a Superficies or Figure perfectly round, described or drawn from a Center, from which the whole Circumference is of equal distance.

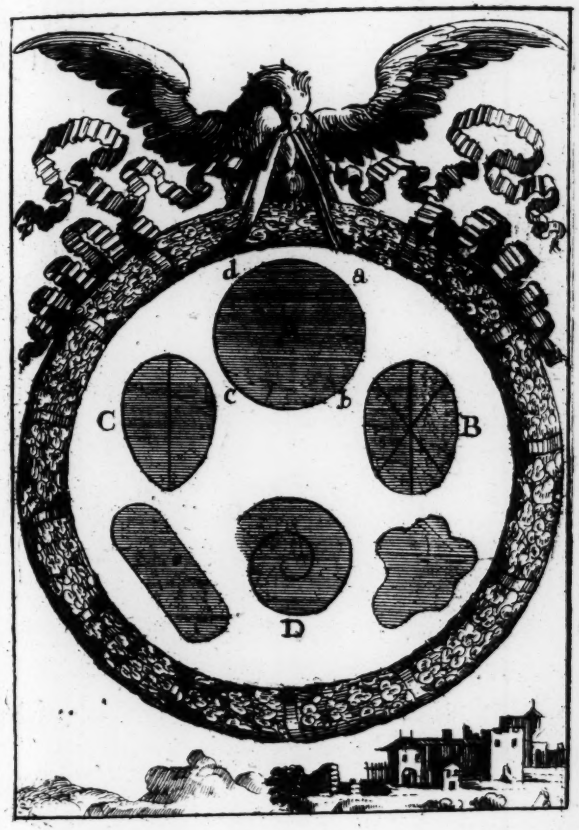
A B C D. The Circumference is the Extremity or outmoſt part of the Circle, otherwiſe it is the Circular line that encloſeth it.

B. An Oval is a crooked Figure drawn from many Centers, and which all the Diameters divide into two equally.

C. An Eclipſe is alſo a crooked Figure drawn from many Centers, but in ſhape of an Egg, within the which there is but one only Diameter, which divideth it into two equally.

D. A Volute is a Figure or Superficies, encompaſſed by a line ſpiral.

Of


d
a
c
b
C
B
D

Of Figures Compoſite.

A. A demi-Circle is a Figure conteined in the Diameter, with the half of the Circumference.

B. A part of a Circle is a Figure conteined within a right line, and a part of a Circle.

F. The great Portion of the Circle, is that which conteineth more then the half of the Circle.

G. The ſmall Portion of a Circle, is that which conteineth leſs then the half of the Circle.

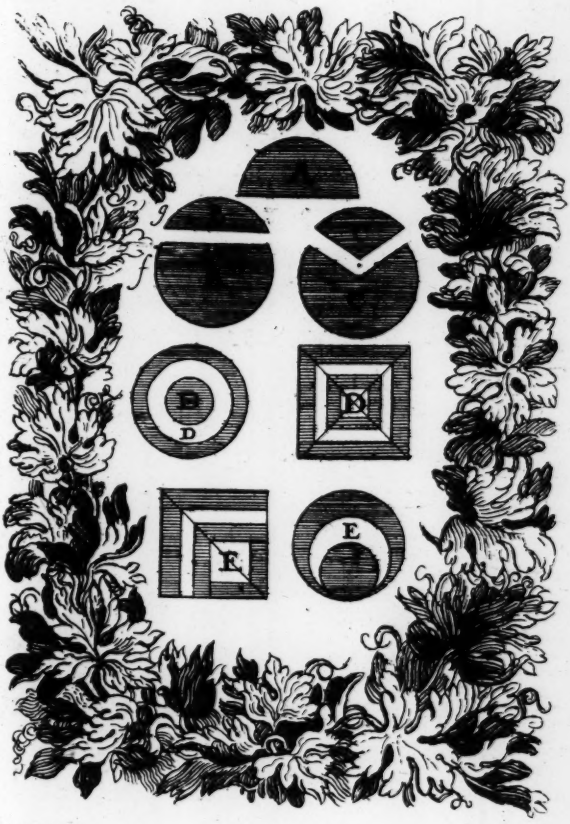
C. A Sector is a Figure contained within two Semi-Diameters, with more or leſs then the half of the Circle.

There is likewiſe the great and the ſmall Sector.

D. Figures Concentrical, are thoſe which have one and the ſame Center.

E. Figures Excentrical are thoſe which are contained in others of divers Centers.

Of


g
f
D
D
E
E

Of Figures Regular and Irregular.

A. A Figure Regular is that which hath its oppoſite parts like an Equal.

B. An irregular Figure is that which is compoſed of Angles and Sides unlike.

E E. Figures alike are thoſe whereof all the Patts of one are proportionable to all the Parts of the other, although the one be greater or equal, or leſſer then the other.

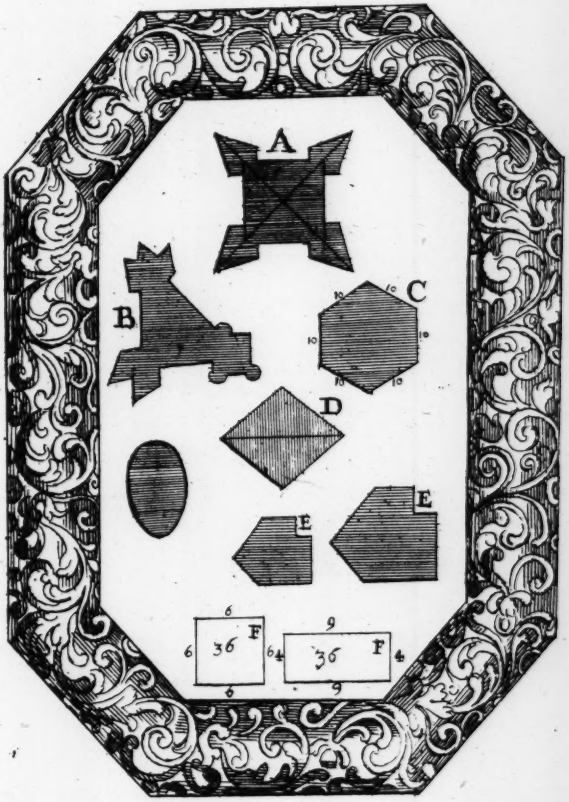
F F. Figures equal are thoſe which contein equally, which may be like and unlike.

C. The Figure Equi-Angle, which hath all its Angles equal.

E E. One Figure is Equi-Angle to another, whenas all the Angles of the one, are equal to all the Angles of the other.

C D. A Figure equilateral, which hath all its ſides equal.

The


A
B
C
10
10
10
10
10
10
D
E
E
6
6
36
F
6
6
9
9
36
F
4
9

The Axiomes.

I.

THings equall to the one and the ſame, are equall amongſt themſelvs.

By the Definition of a circle. The lines A C, A C. which are equall to A B. are alſo equal between themſelves.

II.

If to equall things one ſhall add things equall, the wholes will become equal.

The lines A C, A C. are equall.
The added C D, C D. are equall.
All of them A D, A D. are alſo equall.

III.

If from equal things, one take equal things, the Remainder ſhall be equall.

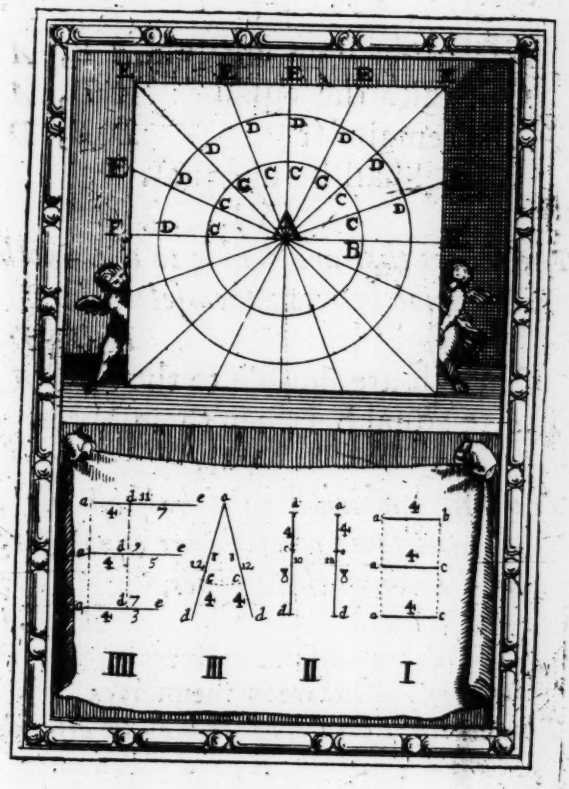
If from equall lines A D, A
One take equall parts. A C, A
The parts remaining C D, C
Shall be alſo equall.

IV.

If to things unequall, one add things equall, the wholes will be unequal.

If to lines unequall D E. D
One does add the equall A D, A
The whole A E, A
Shall be unequal.

5.


III
III
II
I

V.

If from things unequal, one take things equal, the Remainder ſhall be unequal.

If from the lines unequal *A E*, *A E*.
One take the equal *A D*, *A D*.
The remainder *D E*, *D E*.
Shall be unequal.

VI.

The things that are double to one another, are equal between themſelves.

The right lines *D D*, *D D*.
Which are double to the line *A D*.
Are equal between themſelves.

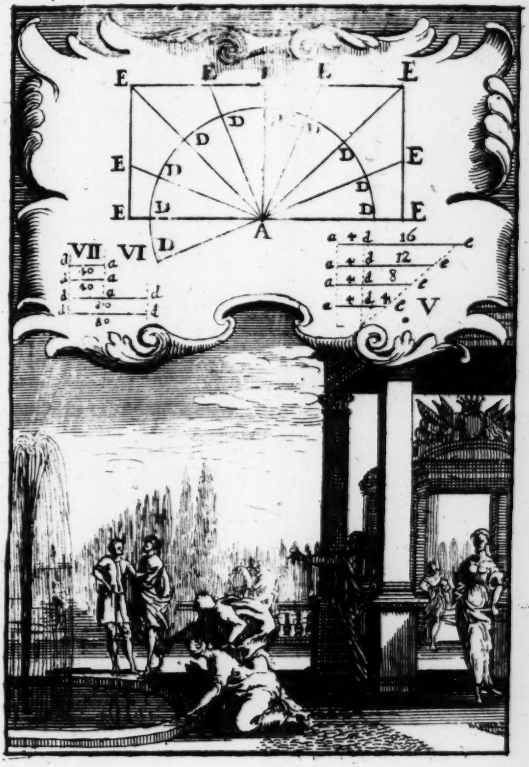
VII.

The things which are the half of the one and the ſame, or of things equal, are equal amongſt themſelves.

The lines *A D*, *A D*.
Which are half of the lines *D D*, *D D*.
Are equal between themſelves.

That which is ſaid of Lines, may be alſo ſaid of Numbers, Superficies, and of Bodies.

THE


E
E
E
E
D
D
D
D
E
E
D
D
E
E
D
D
A
VII
VI
V
a + d 16 e
a + d 12 e
a + d 8 e
a + d 4 e

THE PETITIONS.

The Petitions or Demands ſerving fo
the Ordering of the Practice.

Demand I.

DRaw a ſtraight line from the point *A*
To the point *B*

The Practice.

Apply the Rule to the points *A & B*
Draw the line demanded *A. B*
By letting the Pencil or Draught ru
cloſe to the rule from the point *A*
Unto the point *B*

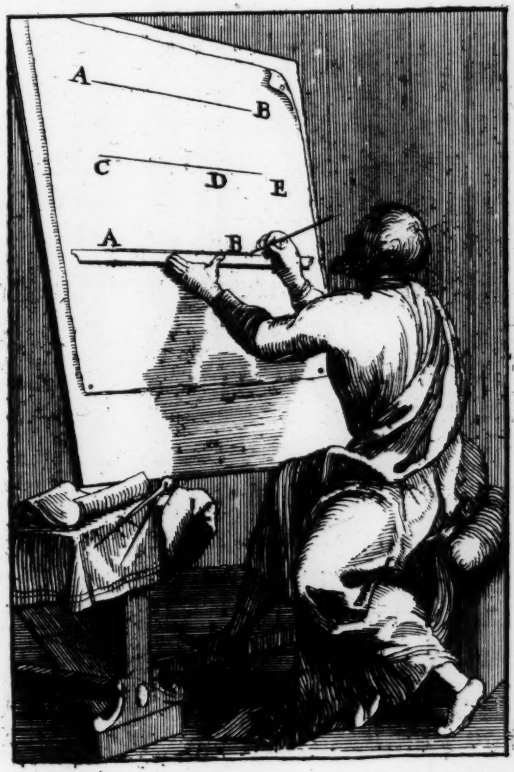
Demand II.

Enlarge infinitely the line *C D*
as the ſide of the end *D*

The Practice.

Joyn the Rule to the line *C D*
Continue infinitely the ſaid line *C D*
On the ſide of the end *D*
Letting the Pen run by the Rule
towards *E*

De


A
B
C
D
E
A
B

Demand III.

Draw a Circle from the Point: *A.*
And the Intervall. *A,B.*

The Practiſe.

Set one of the Points of the Compaſs
at the Point given *A.*
Open the other unto the point *B.*
Turn the Compaſs upon the point *A.*
And drawing it from the point *B.*
Deſcribe the Circle demanded. *B.C.D.*

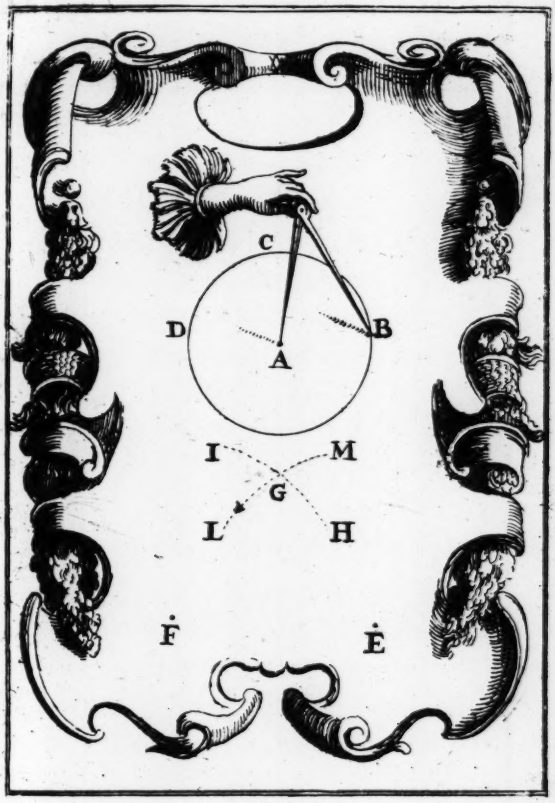
Demand IV.

From the Points given. *E. & F.*
Make a ſection.

The Practiſe.

Open the Compaſs at pleaſure, yet in ſuch manner, that the opening of two points may be greater then the half of the diſtance, which is between the two points propounded. *E & F.*

By this opening of the Compaſs from the point *E*, draw the Arch *L.M.*
From the point *F* draw the Arch *H.I.*
The ſection *G.*
Shall be the demanded.


C
D
A
B
I
M
G
L
H
F
E

THE FIRST BOOK OF THE *Description of LINES.*

PROPOSITION I.

To elevate a Perpendicular from a Point propounded within the middle of a ſtraight line.

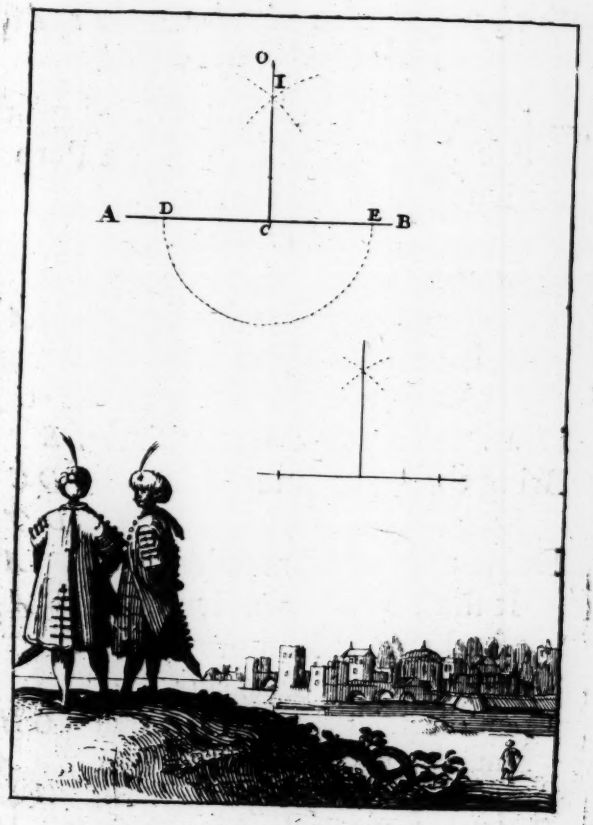
The Poſition.

Let *C* be the point propounded within the midſt of the line *A B*, from which a Perpendicular muſt be elevated.

The Practiſe.

From the Point given
Draw at pleaſure the half-circle. *D*
From the Points *D C*
Make the ſection
From the point
Draw the right line demanded *C*
By the ſection
This line *C.O.* ſhall be Perpendicular to the line given *A. B.* and elevated from the Point propounded *C.*

PR


O
I
A
D
C
E
B

PROPOSITION II.

To elevate a Perpendicular at the end of a right line Propounded.

Let A. be the end propounded of the line A B. upon the which a Perpendicular must be elevated.

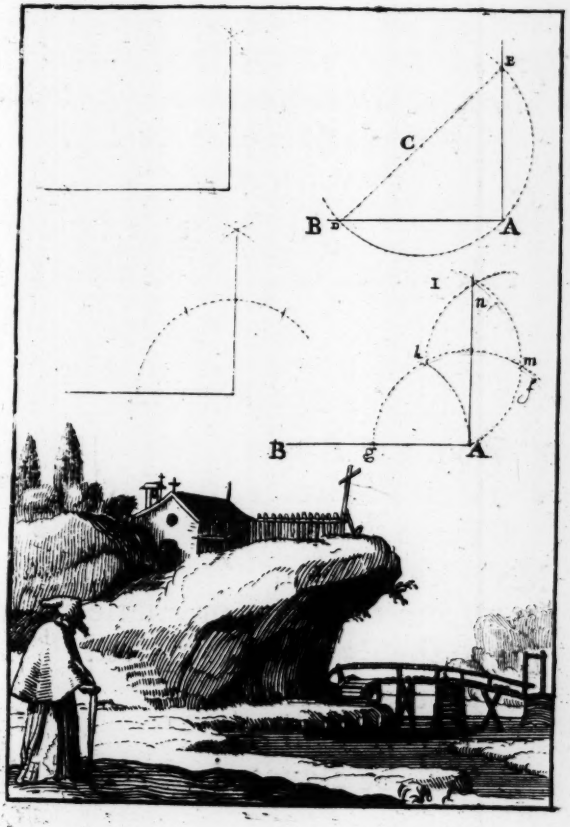
The Practice.

SEt at pleasure th point	C.
Above the line	A B.
From this point	C.
And the Interval	C A.
Draw the portion of the Circle.	E A D.
Bring the right line	D C E.
By the points	D & C.
Draw the line demanded	A E
It shall be Perpendicular to	A B.
And to the End propounded	A

Otherwise,

From the point *A*, draw the Arch	G H M
From the point *G*, draw the Arch	A H
From the point *H*, draw the Arch	A M N
From the point *M* draw the Arch	H N
Draw the line demanded	A N

PRO


E
C
B
D
A
I
n
l
m
f
B
g
A

PROPOSITION III.

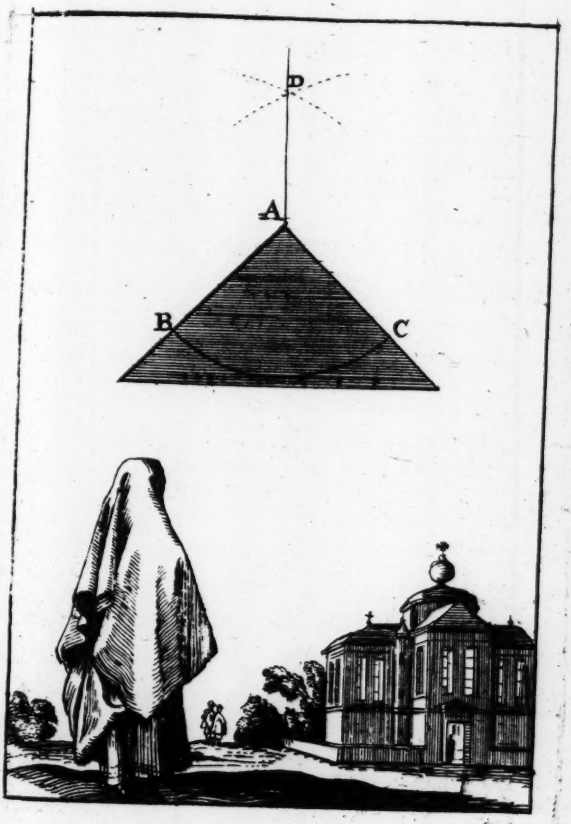
Upon an Angle given, to elevate a right line, which inclineth neither to the right hand nor to the left.

Let B *A C* be the Angle upon the which a right line muſt be elevated, which inclineth neither to the right hand nor left.

The Practice:

FRom the Angle given *A.*
Draw at pleaſure the Arch *B C.*
From the points or ends *B & C.*
Make the ſection *D.*
From the point or Angle given *A.*
Draw the right line required *A D.*
By the ſection *D.*
This right line *A D.*
Shall be elevated upon the Angle *B A C.*
Without inclining either to the right hand or to the left.

PRO


D
A
B
C

PROPOSITION IV.

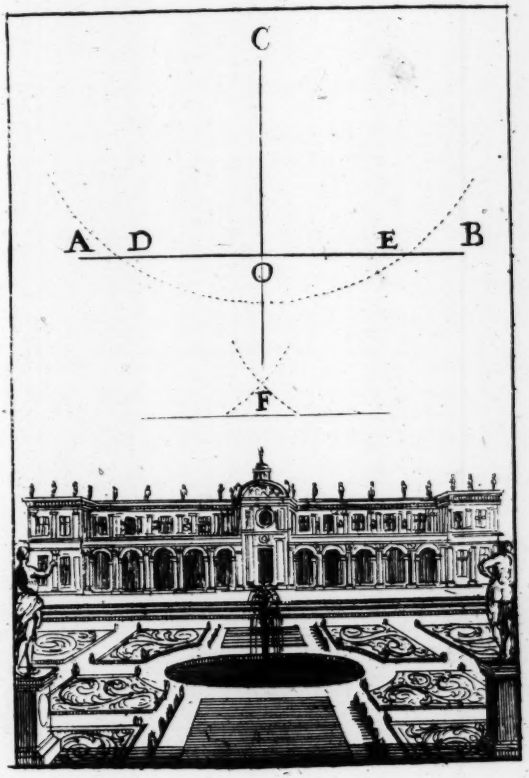
To depreſs or bring down a Perpendicular line upon a right line given, and from a point without the ſame.

Let C, be the Point given, from which a Perpendicular line is to be brought down upon the line *A B*.

The Practice.

From the point given *C*
Draw at pleaſure the Arch *D E*
Cutting the line *A B*
At the points *D & E*
From the points *D & E*
Make the ſection *F*
Draw the line *C F*
The line *C G*
Will be the demanded.

PRO


C
A
D
E
B
O
F

PROPOSITION V.

By a Point given to draw a Line Parallel to a right line given.

Let A be the Point by the which we must draw a line, , which may be Parallel to the line *B C.*

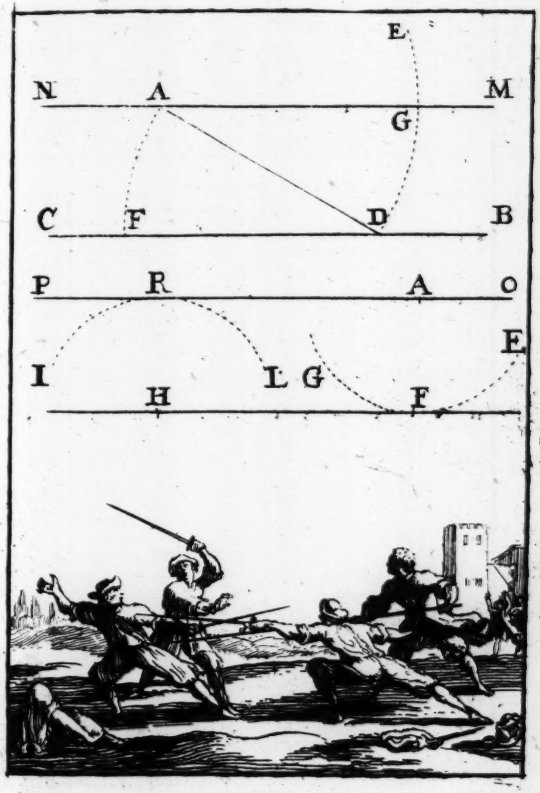
The Practice.

DRaw at pleasure the oblique line *A D.*
From the point *A.*
Draw the Arch *D E.*
From the point *D.*
Draw the Arch *A F.*
Make the Arch *D G.*
Equal to the Arch *A F.*
Bring the line demanded *M N.*
By the points *A & G.*

Otherwise.

From the point *A* draw the Arch *E F G.*
Touching the line *B C.*
Without changing or opening of the Compass.
From the point H draw the Arch *L R I.*
The point H. *is placed at pleasure within the line* *B C.*
Draw the line demanded *O P.*
By the point *A.*
And grating upon the Arch *L R I.*

PRO-


E
N
A
M
G
C
F
D
B
P
R
A
O
E
I
L G
H
F

PROPOSITION VI.

To cut a right line given, and bounded into two equally.

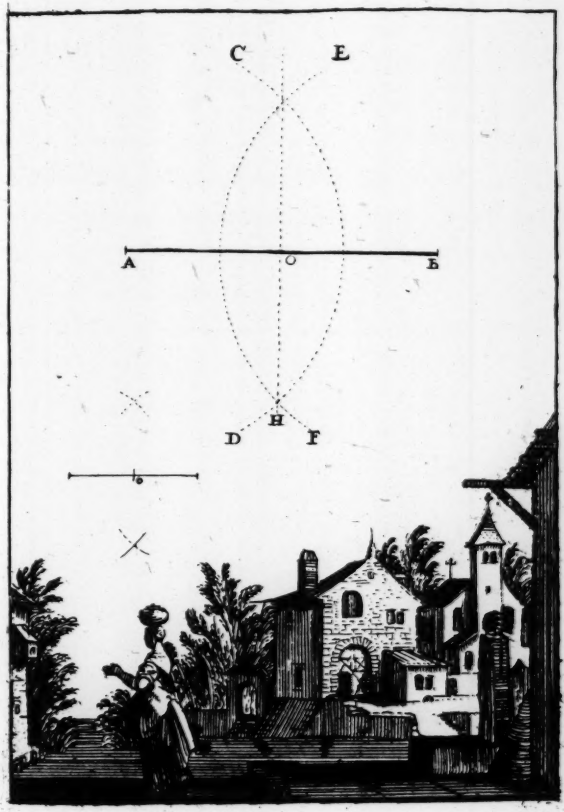
The POSITION.

Let *A B* be the right line propounded to be cut into two equally.

The Practice.

FRom the point or end *A.*
Draw the Arch *C D.*
Without changing the opening of the Compasses.
From the point or end *B.*
Draw the Arch *E F.*
These two Arches must divide each other.
Draw the right line *G H.*
By the sections *G & H.*
A B shall be divided into two equally
At the point *O.*

PRO-


C
E
A
O
B
D
H
F

PROPOSITION VII.

To cut an Angle Rectilinear given into two equally.

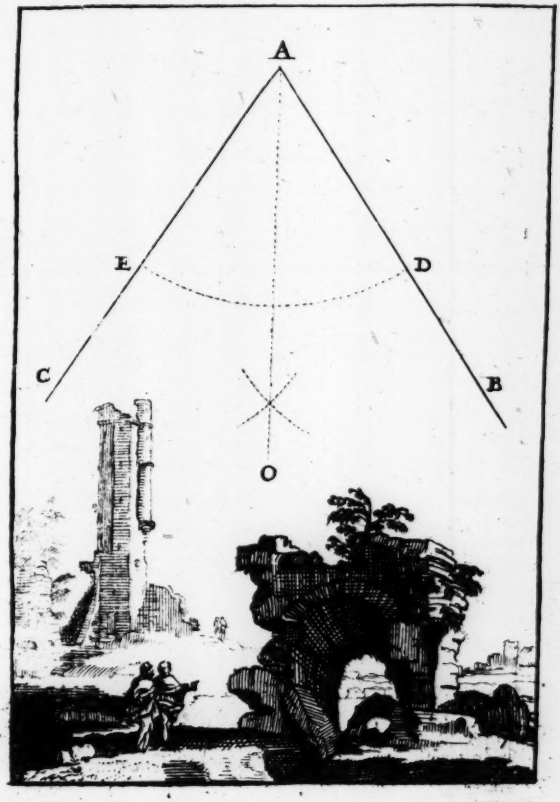
Let *B A C.* be the Angle propounded to be cut into two equally.

The Practice.

FRom the Angle *A.*
Draw at pleaſure the Arch *D E.*
From the points *D & E.*
Make the ſection *O.* *O.*
Draw the line *A O.*

This line *A O.*
Shall divide the Angle given *B A C.*
Into two equally

PRO-


A
E
D
C
B
O

PROPOSITION VIII.

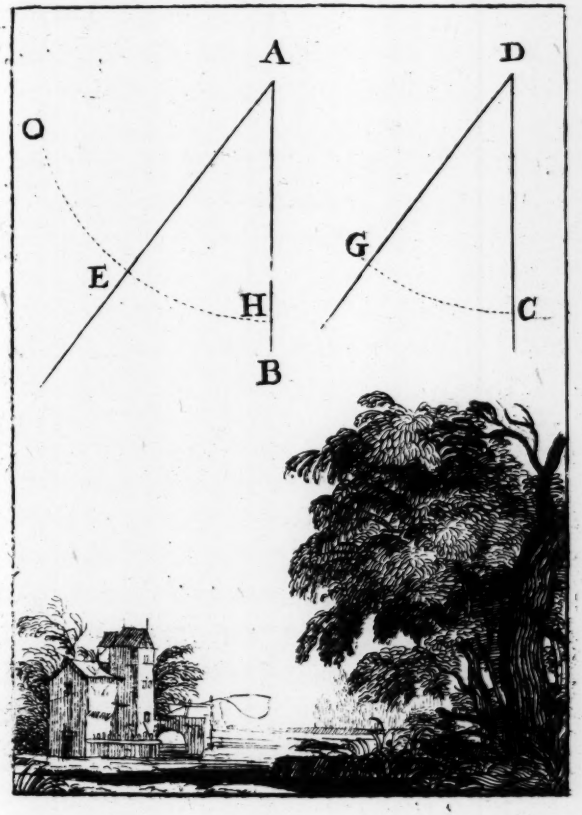
At the end of a right line to make an Angle Rectilinear, equal to an Angle Rectilinear propoſed.

The POSITION.

Let A. be the end of the line A B. to the which we muſt make an Angle equal to the Angle Rectilinear given C D G.

The Practice.

From the Angle D.
Draw at pleaſure the Arch C G.
Without changing the opening of the Compaſſes.
From the point or end A.
Draw the Arch H O.
Make the Arch H E.
Equal to the Arch C G.
Draw the line A E.
The Angle B A E.
Shall be equal to the Angle C D G.
The which was propounded to be done. PRO-


A
D
O
G
E
H
C
B

PROPOSITION IX.

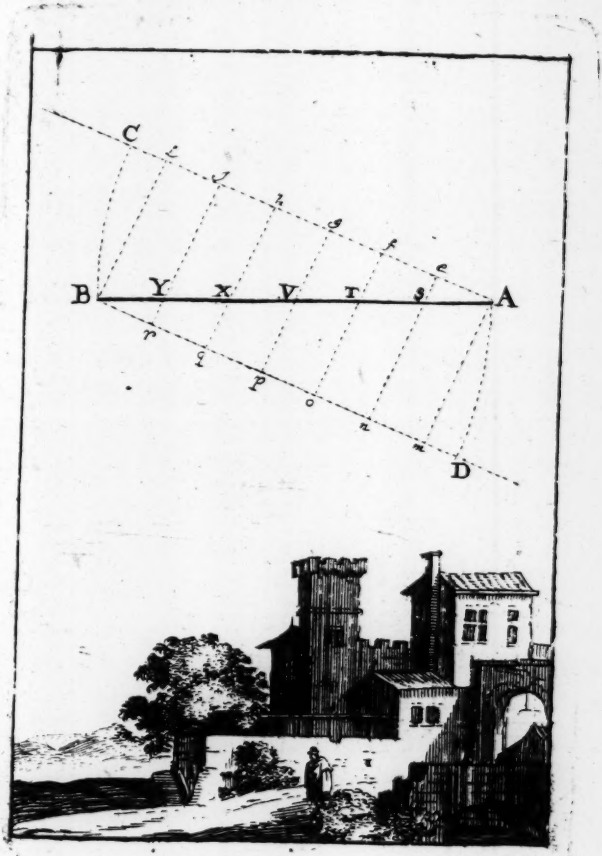
To divide a ſtraight line given into as many equal Parts as one will.

Let *A B* be the line propoſed to be divided into ſix equal parts.

The Practice:

From the end *A.*
Draw at diſcretion the line *A C.*
From the end *B.*
Draw the line *B D.*
Parallel to the line *A C.*
From the points *A & B.*
And upon the lines *A C B D.*
Bring at diſcretion ſix equal parts, *viz. E F G H I L*, upon the line *A C.*
R Q P O N M upon the line *B D.*
Draw the lines *E N, F O, G P, H Q, L R.*
The line *A B.*
Shall be divided into ſix equal Parts by the Sections *S, T, V, X, Y.*

PRO-


C
B
Y
X
V
T
S
A
D

PROPOSITION X.

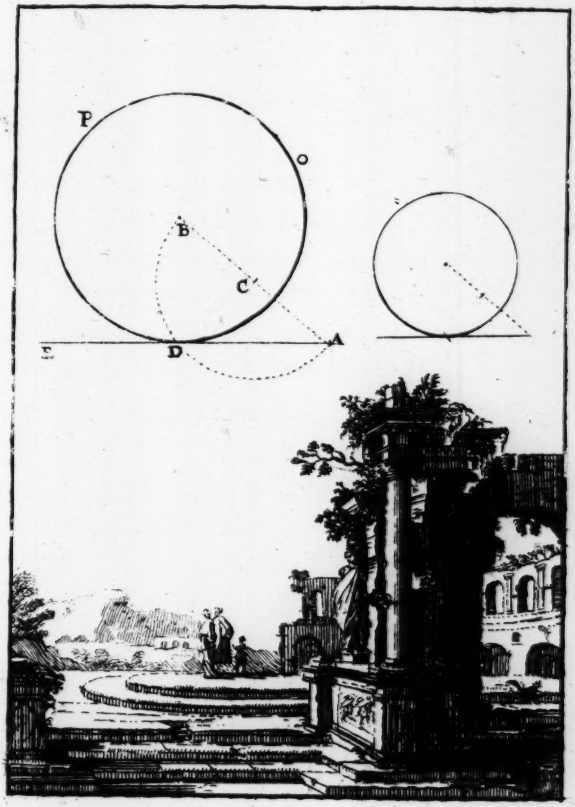
From a Point given to draw a ſtraight line, which toucheth a Circle propounded.

Let *A.* be the point from which we muſt draw a line which toucheth the Circle *D O P.*

The Practice.

FRom the Center of the Circle *B.*
Draw the line ſecant *B A.*
Divide this line *B A.*
Into two equally in *C.*
From the point *C.*
And the Interval *C A.*
Draw the demicircle *A D B.*
Cutting the Circle in *D.*
From the point given *A.*
Draw the right line *A E.*
By the point *D.*
This right line *A E.*
Shall be the line touching the required.

PRO-


P
O
B
C
E
D
A

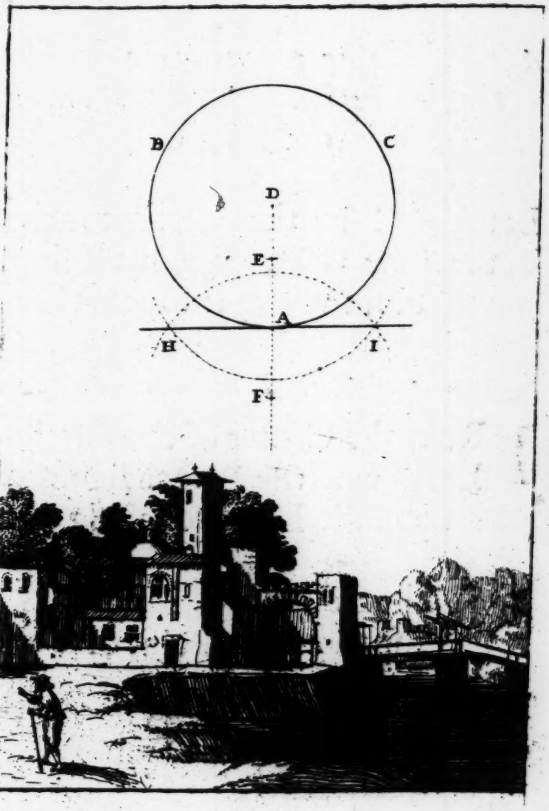
PROPOSITION XI.

To draw a right line, which toucheth a Circle at a Point propounded.

Let *A B C* be the Circle given within the Circumference of which is the Point *A.* propounded.

The Practise.

From the Point or Center D
Draw the Line D F.
by the Point propounded A.
At the Point propounded A.
And upon the Line D. F.
Draw the Perpendicular A. H.
Prolonged towards I.
This Line Tangent H I.
ſhall touch the Circle at the Point propounded A.
The which is required by the Propoſition


B
C
D
E
A
H
I
F

PROPOSITION XII.

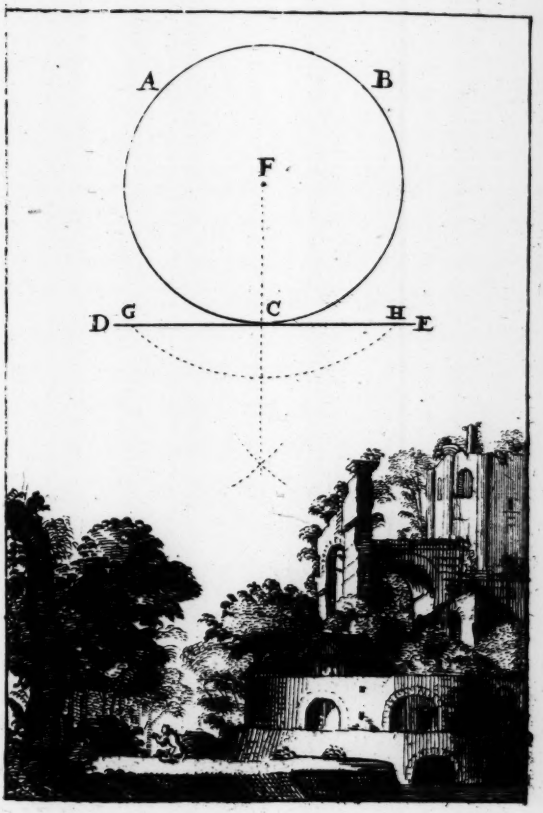
A Circle being given, and a ſtraight line that toucheth it, to finde the Point where it Toucheth.

Let A B C be the Circle touched by the Line G H, wee muſt finde the Point where it toucheth.

The Practice.

FRom the Center of the Circle F: Let downe the Perpendicular F C. upon the Line Touching D E.

The ſection C. ſhall be the Point of Touching demanded.


A
B
F
D
G
C
H
E

PROPOSITION XIII.

To deſcribe a line Spiral upon a ſtraight line given.

Let I L. be the line upon which we would deſcribe a line ſpiral.

The Practice.

Page 18. PRovide the half of the line *I L.*

Into as many equal parts as you Would deſcribe the Revolution.

Example.

If you would divide it into four

Divide the half *B I.*

Into four equal parts *B C E G I.*

Page 12. Divide alſo *B C.*

Into two equally at *A.*

From the point *A.*

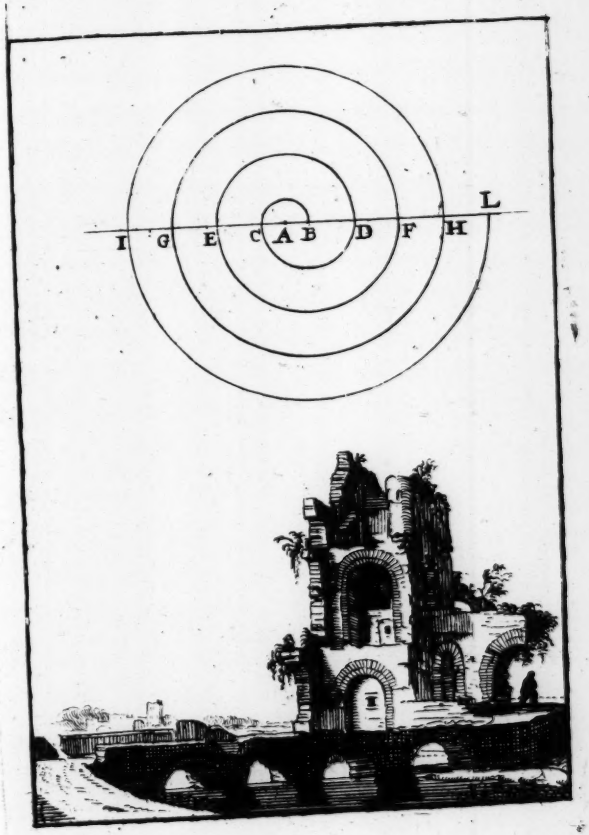
Draw the demi-circles *B C, D E, F G, H I.*

From the point *E.*

Draw the demi-Circles *C D, E F, G H, I L.*

And you ſhall have the ſpiral line required.

PRO-


I
G
E
C
A
B
D
F
H
L

PROPOSITION XIV.

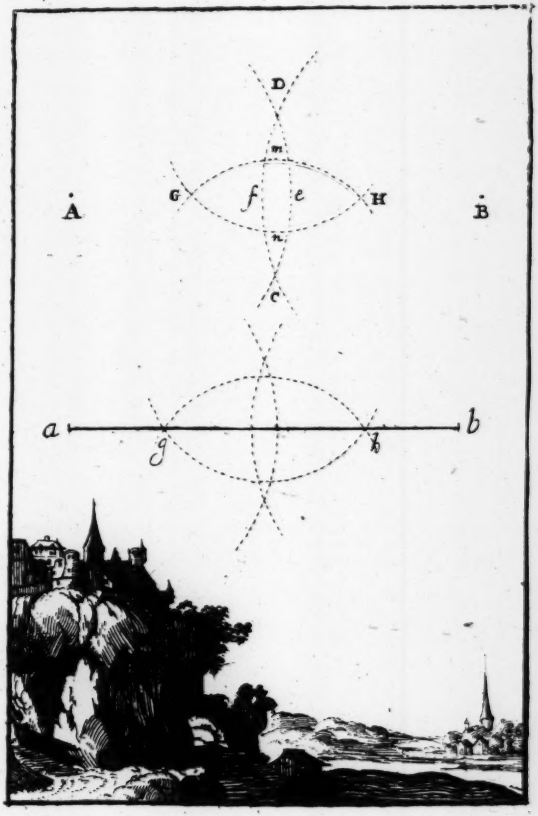
Between two Points given to finde two other directly interposed.

Let A & B be the Points given, between the which we muſt finde two other points directly interpoſed, by the means whereof we may draw a ſtraight Line from the point **A** to the point B, with a ſhort Ruler.

The Practice.

FRom the points A & B.
make the ſections C & D.
From the points C & D.
Make the ſections G & H.
The Points G & H.
Shall be the demanded, by the means of which one may draw three wayes a right Line from the Point A to the point B. the which could not be done in one with a Ruler which ſhould be ſhorter, then the ſpace between A & A.

PRO-


D
m
A
G
f
e
H
B
n
c
a
g
b
b

THE SECOND BOOK OF THE *Construction of plain Figures*

PROPOSITION I.

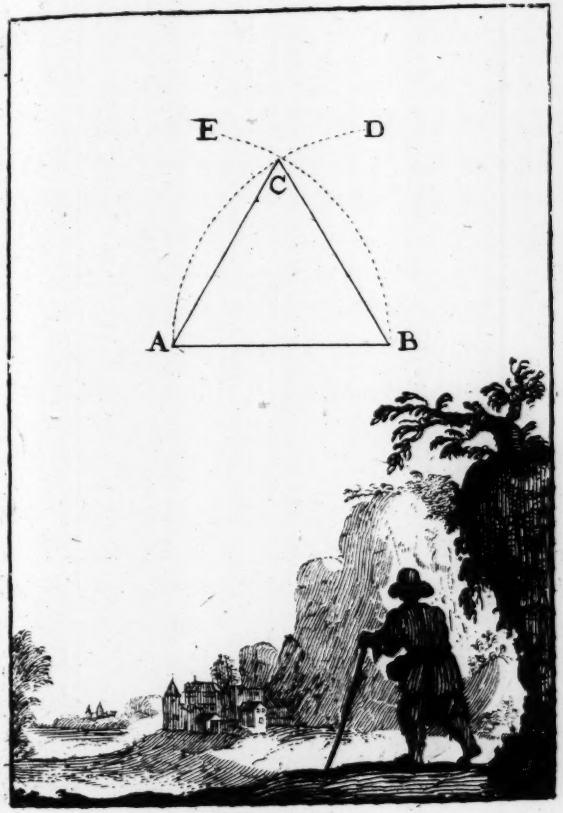
To frame a Triangle Equilateral upon a right line given and bounded.

Let A B be the line given upon the which we muſt frame a Triangle Equilaterall.

The Practice.

FRom the End A.
and the Interval A B.
Deſcribe the Arch B D.
from the End B.
and the Interval B A.
Deſcribe the Arch *A E.*
From the ſection C.
Draw the lines *C A, C B.*
A B C ſhall be the Triangle Equilateral demanded.

PRO-


E
D
C
A
B

PROPOSITION II.

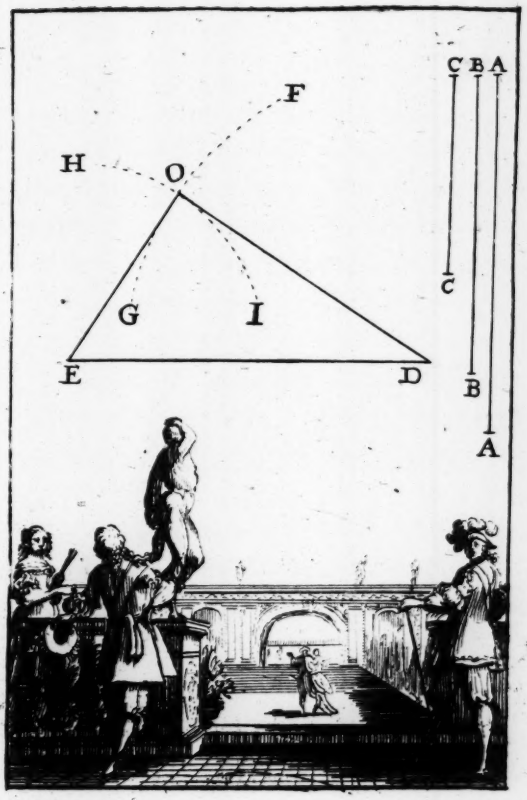
To make a Triangle of three ſtreight lines, equal to three ſtreight lines given.

Let A B C be the three lines given we muſt make a Triangle of three right lines equal to them.

The Practice.

Draw the right line D E.
Equal to the line A A.
From the point D.
And from the Interval B B.
Deſcribe the Arch G F.
From the point E.
And from the Interval C C.
Deſcribe the Arch H I.
From the ſection O.
Draw the lines O E, O D.
The Triangle D E O.
Shall be compriſed of three right lines
Equal to the three right lines given
A A, B B, C C.

PRO-


C B A
F
H
O
G
I
E
D
C
B
A

PROPOSITION III.

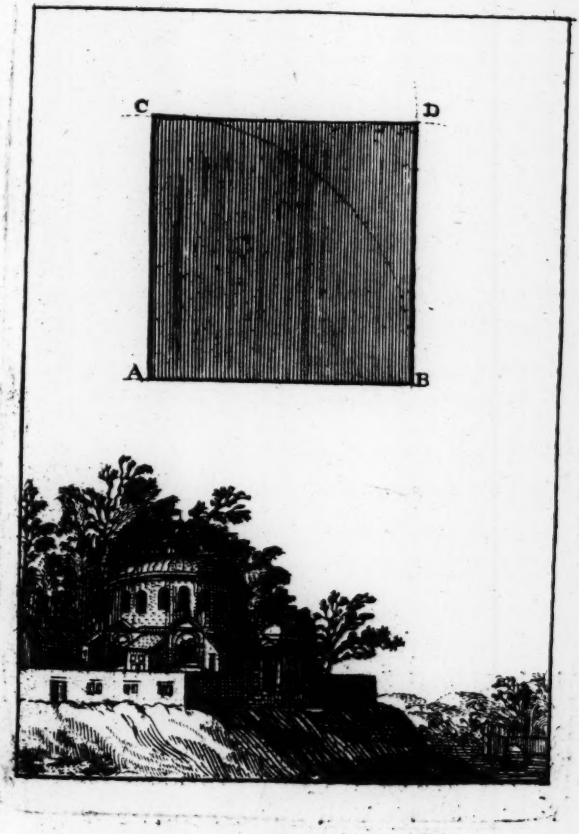
To frame a ſquare upon one right line given and bounded.

Let *A B* be the right line given and bounded, upon the which we muſt frame a ſquare.

The Practice.

Page. 4. Elevate the Perpendicular *A C.*
From the point *A.*
Deſcribe the Arch B C.
From the ponits B & C,
And from the Interval A B.
Make the ſection D,
From the point D.
Draw the lines *D C, D B.*
A B C D ſhall be the ſquare demanded framed upon the right line given A B.

PRO-


C
D
A
B

PROPOSITION IV.

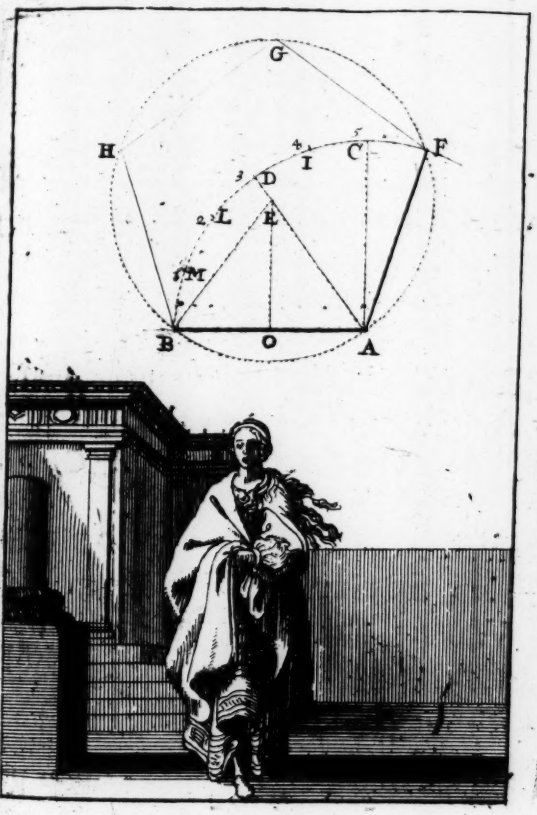
To frame a Pentagone Regular upon a right Line given.

Let A B be the line given upon the which we muſt frame a Pentagone.

The Practice.

FRom the End A.
And from the Interval A B.
Deſcribe the Arch B D F.
Elevate the Perpendicular A C.
Divide the Arch B C.
into five Equall Parts I D L M.
Draw the right line A D.
Cut the Baſes A B.
into two Equally in O.
Elevate the Perpendicular O E.
from the ſection E.
and from the Intervall E A.
Deſcribe the Circle A B F G H.
Bring five times the line A B.
Within the Circumference of the circle and you ſhall have a Pentagone regular, Equiangle, Equilaterall A B F G H.

PRO-


G
H
I
C
F
D
L
E
M
B
O
A

PROPOSITION V.

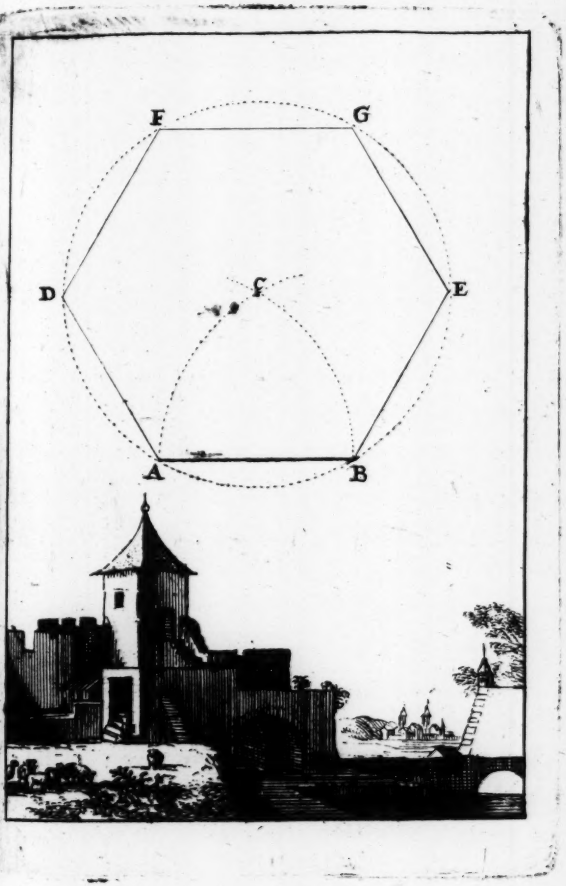
To frame an Exagone Regular upon a right Line given.

Let A B be the right line upon the which we muſt frame an Exagone.

The Practice.

FRom the End *A* & *B*
And from the Interval *A B*
Deſcribe the Arches *A C*, *B C*
from the ſection *C*
Deſcribe the Circle *A B E F G*
Bring ſix times the line given *A*
Within the Circumference, an
you ſhall have an Exagone Re
gular *A B E F G D.* framed up
on the line given *A*

PRO


F
G
D
C
E
A
B

PROPOSITION VI.

Upon a right Line given, to deſcribe ſuch a Poligone, as you would have from the Exagone Unto the Dodecagone.

Let A B be the line, upon the which that muſt frame an Exagone, or an Eptagone, or an Octogone &c.

The Practice

page 10 Cut the line A B into two Equall in O

Elevate the Perpendicular O

From the Point B deſcribe the Arch A

Divide A C into ſix equal parts M N P Q R. this may make an Eptagone if you will

From the point *C.* and the Interval of one part *C M*

Deſcribe the Arch *M D*

D ſhall be the Center to deſcribe a Circle, capable of containing ſeven times the line A B

If you would make an Octogone.

From the point *C* and the Interval of two parts C N. deſcribe the Arch N

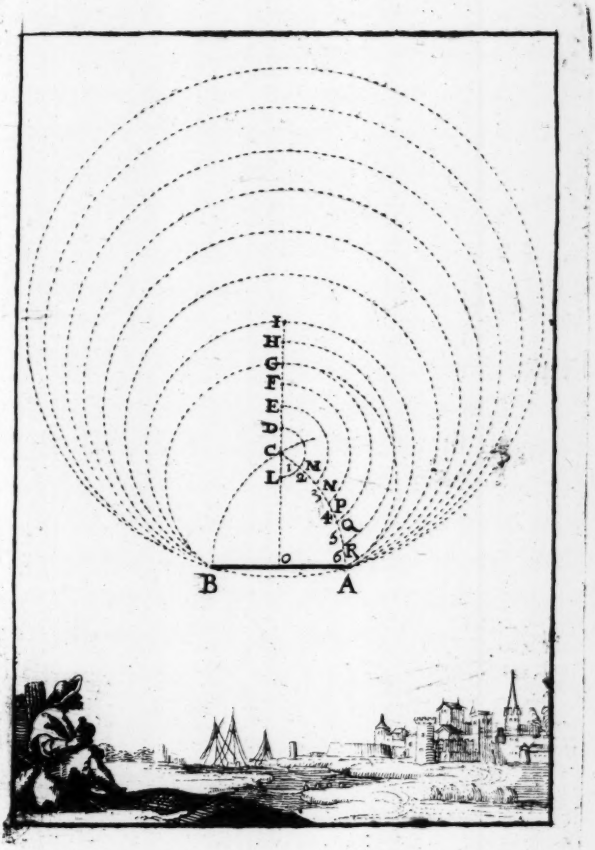
E. ſhall be the Center to deſcribe a Circle capable of containing eight times the line A B

If you would make an Enneagone.

You muſt take the three parts C

And ſo likewiſe of others, always augmenting by one part.

PRO-


I
H
G
F
E
D
C
L
1
2
N
3
N
P
4
Q
5
R
6
O
B
A

PROPOSITION VII.

Upon a right line given to frame ſuch a Poligone, as one would have from 12 *to* 24 *ſides.*

Let AB. be the line upon the which one would frame any Poligone.

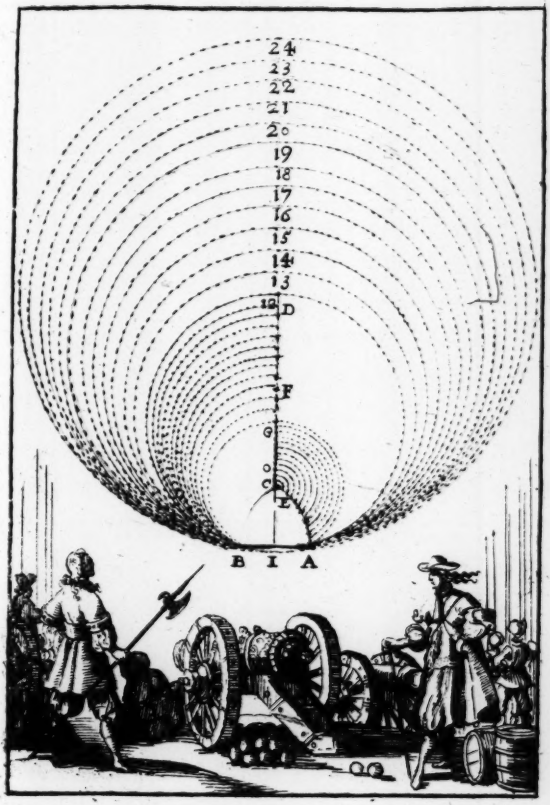
The Practice.

DIvide the Arch *AC.*
Into twelve equal parts
From the point *C.*
Take as many parts upon *CA.*
As there is need above the twelve to have as many parts as one requireth of the ſides.

Example.

If you would make a Figure of fifteen ſides.
From the point C.
And from the Interval of three parts CE.
Deſcribe the Arch EO.
AC of 12, *CO of* 3 *will make together* 15.
From the point O, and the Interval OB.
Deſcribe the Arch BE.
From the point F and the Interval FA.
Deſcribe a Circumference, it ſhall contain fifteen times the line given *AB*
And ſo of other Poligones.

PRO-


24
23
22
21
20
19
18
17
16
15
14
13
12
D
F
G
E
B I A

PROPOSITION VIII.

Upon a right line given, to deſcribe a Portion of a Circle, capable of an Angle equal to an Angle given.

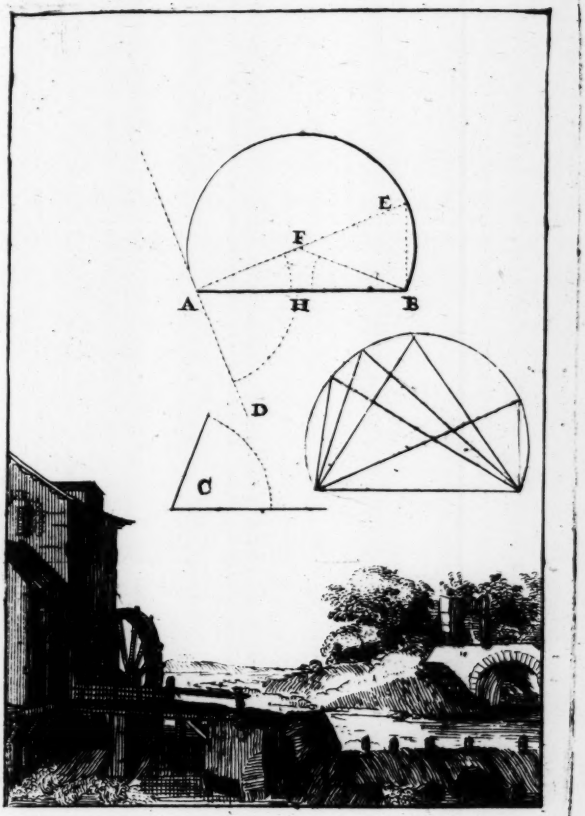
Let A B be a line, bounded npon that which one would make a Portion of a Circle, capable of conteining an Angle equal to the Angle driven *C*.

The Practice.

Make the *Angle* *B A D.*
Page 16. Equal to the Angle *C.*
Page 2. Elevate upon *A D.*
The Perpendicular *A E.*
Page 2. Divide the line *A B.*
Into two equally in *H.*
Elevate the Perpendicular *H E*
From the ſection *F.*
And from the Interval *F A.*
Deſcribe the portion of the Circle. *A E B.*

All the Angles that you ſhall make within the Portion of a Ci cle, and upon the line given *A B*, ſhall be all equal to the Angle *C.*

PR O-


E
F
A
H
B
D
C

PROPOSITION IX.

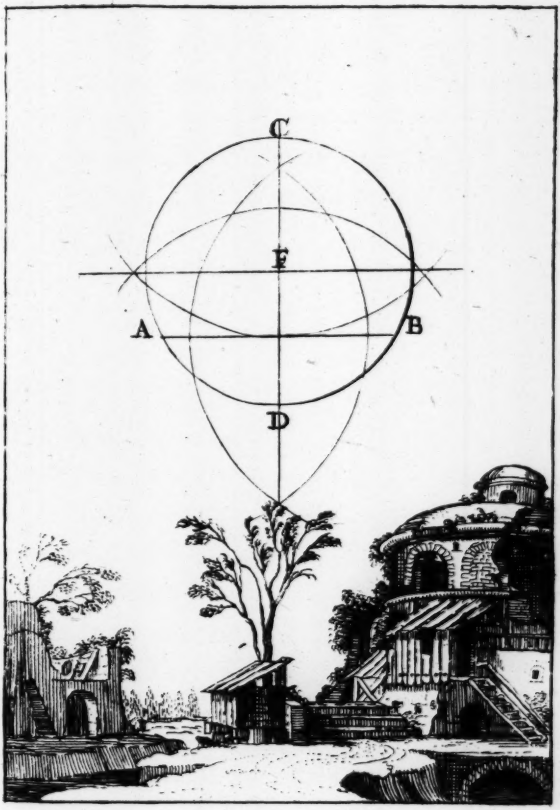
To finde the Center of a Circle given.

Let A B C. be a Circle propounded whereof we muſt finde the Center.

The Practice.

Draw at diſcretion the right line A B.
Bounding it ſelf at the Circumference B C.
Cut this right line A B.
Into two by the line D C.
Cut alſo this right line C D.
Into two equally in F
The point F ſhall be the Center demanded of the Circle A B C.

PRO-


C
F
A
B
D

PROPOSITION X.

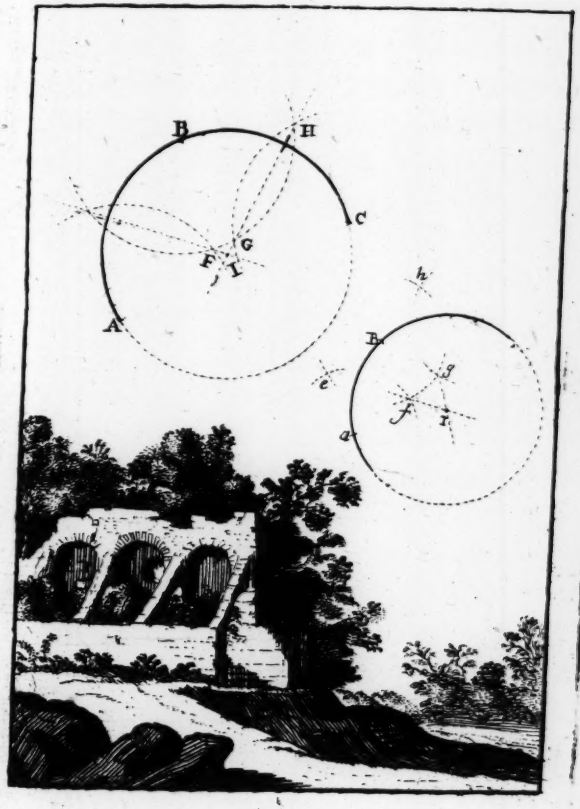
To finiſh a Circumference begun, whereof the Center is loſt.

Let *A B C*, be the part of the Circumference given, we muſt finde the Center, that we may finiſh it.

The Practice.

Place at diſcretion the three Points *A B C.*
Within the Circumference begun.
From the Points *A & B.*
Make the ſections *E & F.*
Draw the right line *E F.*
From the Points *B & C.*
Make the ſections *G & H.*
Draw the right line *G H.*
From the Interſection and Center I.
And from the Interval I A.
Finiſh the Circumference began.

PRO-


B
H
C
G
F
I
A
h
B
g
e
f
i
d

PROPOSITION XI.

To deſcribe a Circumference by three Points given.

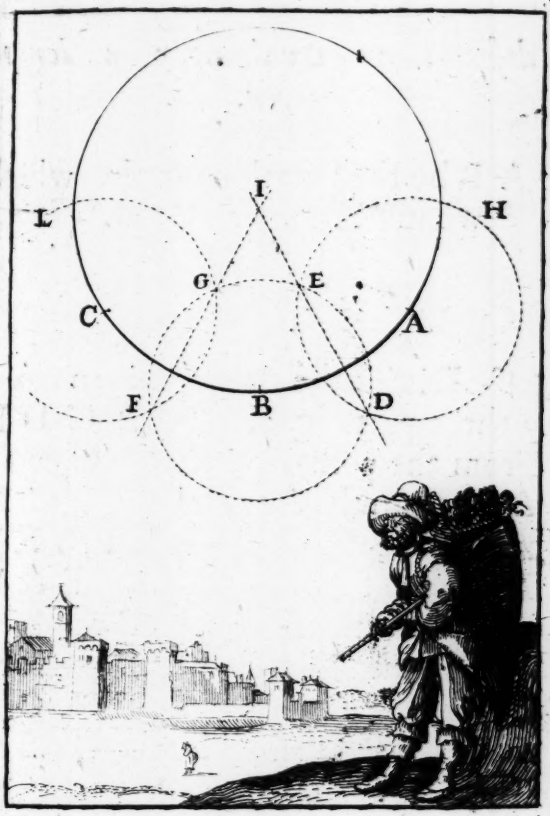
Let A B C be the three Points by the which one would paſs a Circumference.

The Practice.

FRom the Points given A B C.
Deſcribe the three Circles D E H.
D E F, F G L, of the ſame Interval, dividing each other in the Points D & E, F & G.
Draw the right lines D E, F G.
Until that they meet eaeh other in I.
From the point I.
And the Interval I A.
Deſcribe the Circumference required.

This Practice is like the former.

PRO-


I
L
H
G
E
C
A
F
B
D

PROPOSITION XII.

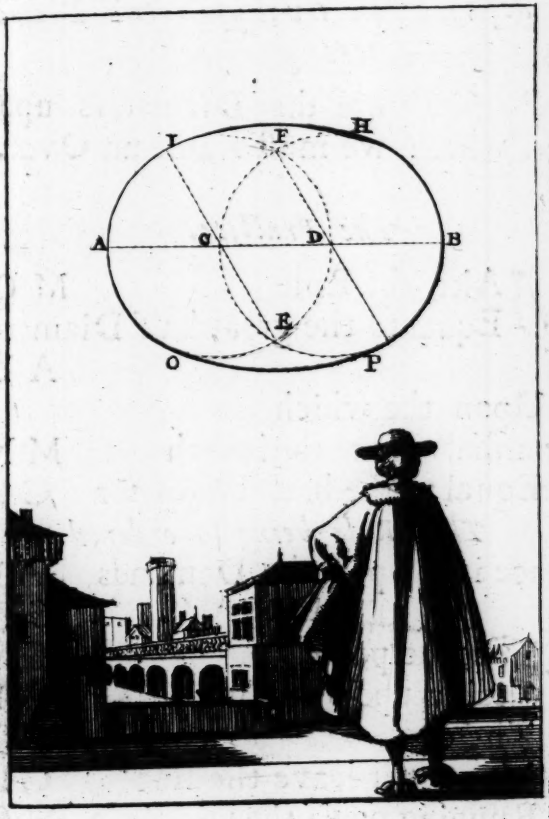
To deſcribe an Oval upon a length given.

Let A B be the length upon the which we muſt frame an Oval.

The Practice.

Page 18. Divide the length given A B
Into three parts equal A C D B.
From the points C & D.
And from the Interval C A.
Deſcribe the Circles A E F, B E F.
From the ſections E & F.
And from the Interval of the Diameter E H.
Deſcribe the Arches I H, O P.
A I H B P O ſhall be the Oval required.

PRO-


I
F
H
A
C
D
B
E
O
P

PROPOSITION XIII.

To deſcribe an Oval upon two Diameters given.

A B, C D are the Diameters upon the which we muſt frame an Oval.

The Practice.

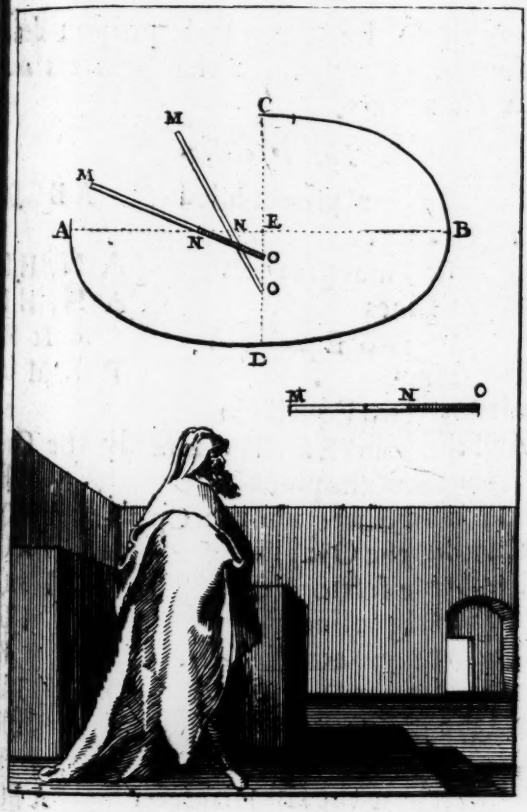
MAke the Rule M O.
Equal to the great half Diameter A E.

Upon the which
You ſhall make the length M N.
Equal to the half Diameter C E.

This Rule being ſo ordered.

Place it ſo upon the Demands A B.
C D.
That the point N.
Sliding upon the line A B.
The end O.
May never leave the line C D.
Running on ſo the ſaid Rule M O.
Deſcribe the Oval by the end M.

PRO-


C
M
M
A
N
N
E
B
O
O
D
M
N
O

PROPOSITION XIV.

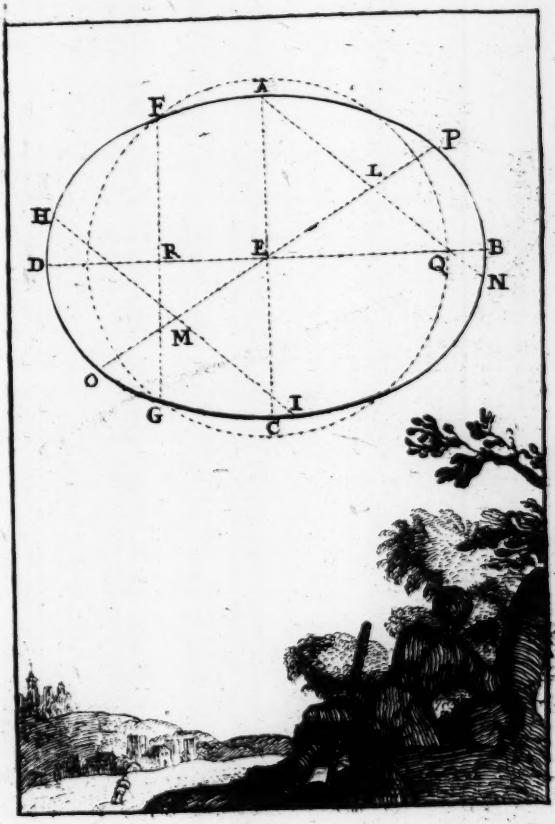
To finde the Center, and the two Diameters of an Oval.

Let ABCD be the Oval propounded, whereof we muſt finde the Centers and the Diameters.

The Practice.

Within the Oval propounded	A B C D.
Pag. 10. Draw at diſcretion	
The Lines parallels	A N, H I.
Cut theſe Lines	A N, H I.
Into two Equally in	L & M.
Draw the line	P L M O.
Cut it into two Equally in	E.
And the point E ſhall be already the Center from the point	E.
Deſcribe at diſcretion the Circle	F H Q.
Cutting the Oval in	F & G.
From the ſections	F & G.
Draw the right line	F G.
Cut it into two equally in	R.
Draw the great Diameter	B D.
By the points	E R.
From the Center	E.
Page 10. Draw the leſs Diameter	A E C.
Parallel to the line	F G.
This is it which was propounded.	

PRO


A
F
P
L
H
D
R
E
Q
B
N
M
O
G
I
C

PROPOSITION XV.

To frame a Figure Recti-linear upon a right line bounded, like unto a Figure Recti-linear Propounded.

Let A B. be the line upon the which we muſt frame a Figure like to the Figure C D E F.

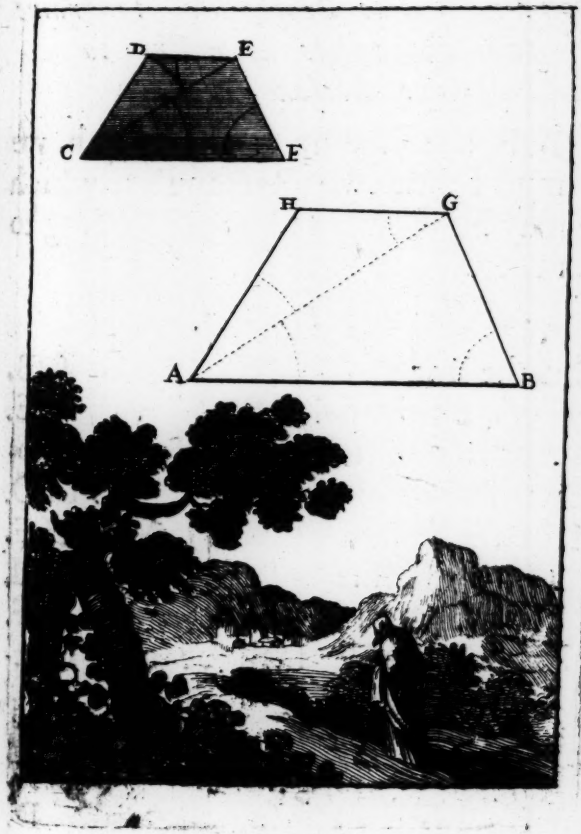
The Practice.

Page 16. DRaw the Diagonal C. E.
Make the Angle B A G.
Equal to the Angle F C E.
Make the Angle A B G.
Equal to the Angle C F E.
The Triangle A B G.
Shall be like to the Triangle. C F E.

The ſame.

Make the Triangle A G H.
Like to the Triangle C E D.
The whole Figure A B G H.
Shall be like to the whole Figure. C D E F

PRO-


D
E
C
F
H
G
A
B

PROPOSITION XVI.

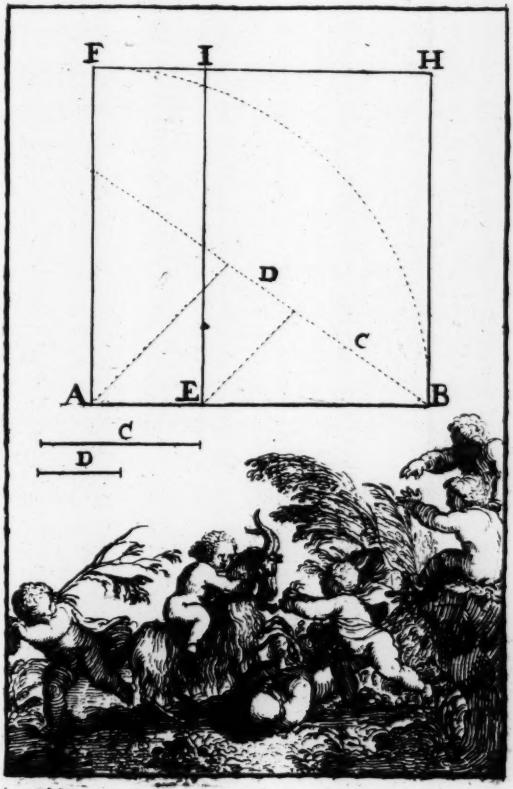
Upon a right line Propounded to frame two Rectangles according to one Reason given.

A B is the line upon the which we must frame two Rectangles, which may be between them, according to the reason of C to D.

The Practice.

Cut the line A B.
Page 138. At the point E.
According to the reason or proportion of C to D.
Make the square A B, H F.
Draw the line E I.
Parallel to the line A F.
B E I H, A E I F shall be the Rectangle required.
The Rectangle A I.
Is to the Rectangle E. H.
As the line D.
Is to the line C.

PRO-


F
I
H
D
C
A
E
B
C
D

THE THIRD BOOK OF THE *INSCRIPTION of Figures.*

PROPOSITION I.

Within a Circle given to inscribe a Triangle Equilateral, an Exagone and a Dodecagone.

Let A B G. be the Circle within which we must inscribe a Triangle Equilateral, &c.

The Practice.

Of the Triangle Equilateral.

FRom the point; as A.
And from the Interval of the half Diameter A B.
Describe the Arch C B D.
Draw the right line D C.
Bring this Interval C D.
From the point C.
To the point F.
Draw the lines F C, F D.
C D F shall be the Triangle required.

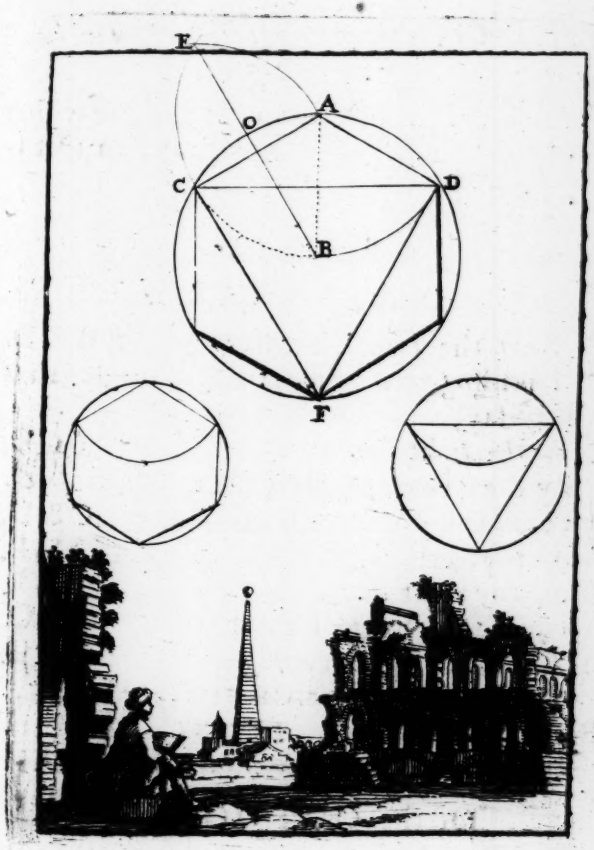
Of the Exagone.

Bring six times the half Diameter A B.
Within the Circumference given.

Of the Dodecagone.

Page 12. Cut the Arch of the Exagone A C.
~~Into two equally~~ in O.
A O shall be the side of the Dodecagone.

PRO-


E
A
O
C
D
B
F

PROPOSITION II.

Within a Circle given to inſcribe a Square, and an Octogone.

Let A B C D be the Circle, within the which one would inſcribe a Square and an Octogone.

The Practice.

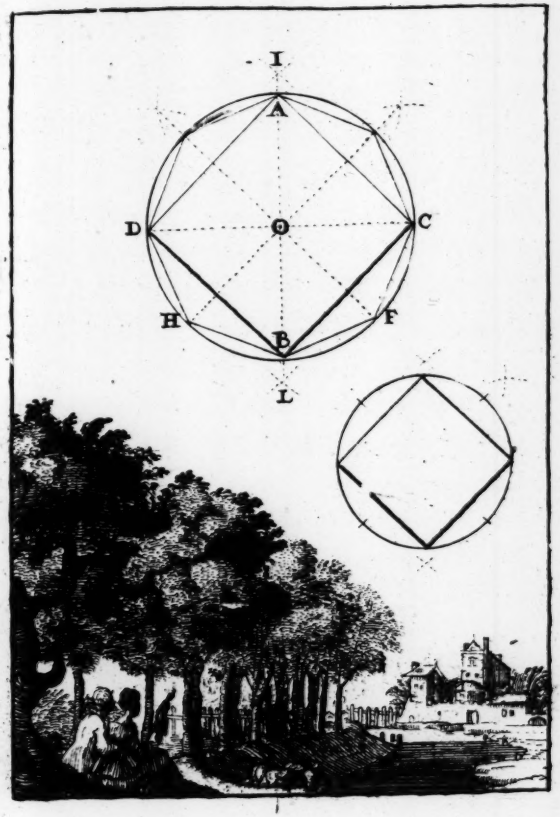
Of the SQUARE.

DRaw the two Diameters A B C D.
Dividing each other at Right Angles, that is to ſay,
Draw the right line C D.
By the Center of the Circle O.
From the Points or Ends C & D.
Make the ſections I & L.
Draw the right line I L.
Paſſing alſo by the Center O.
The Lines or Diameters A B, C D.
Shall divide themſelves at right Angles
Being the lines *A C*, *A D*, *B C*, *B D*. And *A C*, *B D* ſhall be the Square required.

Of the OCTOGONE.

Subdivide every fourth of the Circle, you ſhall make the Octogone.

PRO-



I

PROPOSITION III.

Within a Circle given to inſcribe a Pentagone, & a Decagone.

Let A B, C D be the Circle propounded

The Practice.

of the PENTAGONE.

DRaw the two Diameters A B C D. dividing themſelves at right Angles in E.

Divide the halfe Diameters C E. into two Equally in F.

from the Point F.

And from the Interval F A.

Deſcribe the Arch A G.

from the Point A.

And from the Interval A G.

Deſcribe the Arch G H.

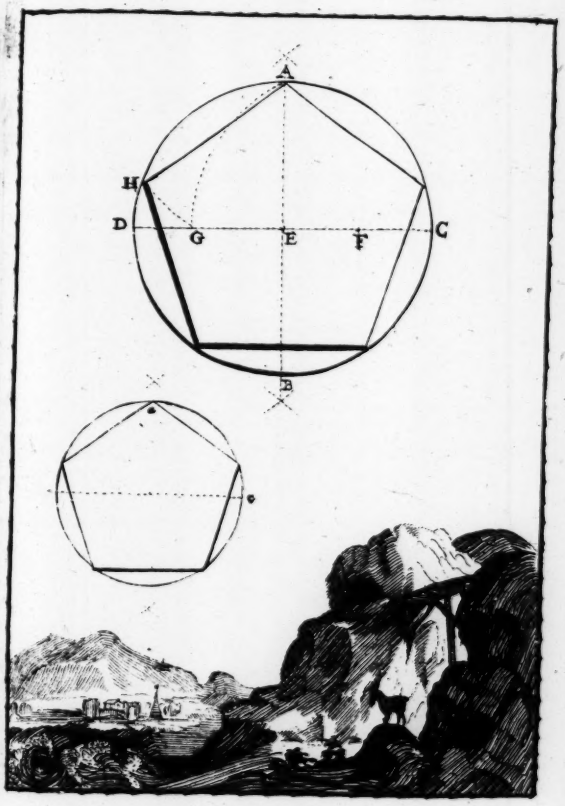
The right Line A H.

ſhall divide the Circle into five Equal Parts.

of the DECAGONE.

Subdivide every Part of the Circle into two Equally.

PRO-


A
H
D
G
E
F
C
B

PROPOSITION IIII.

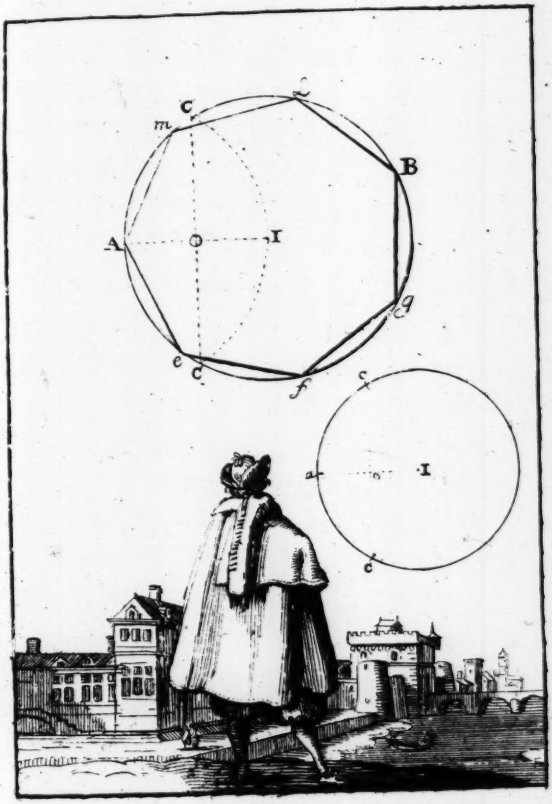
Within a Circle given to inſcribe an Eptagone.

Let A B C be the Circle propounded, within the which we muſt make an Eptagone.

The Practice.

DRaw the half Diameter I A.
From the End A.
and from the Interval A I.
Deſcribe the Arch C I C.
Draw the right line C C.
Beare the half C O.
Seven times within the Circumference of the Circle, you ſhall have the Eptagone required.

PRO-


C
m
B
A
O
I
g
e
C
f
c
a
I
c

PROPOSITION V.

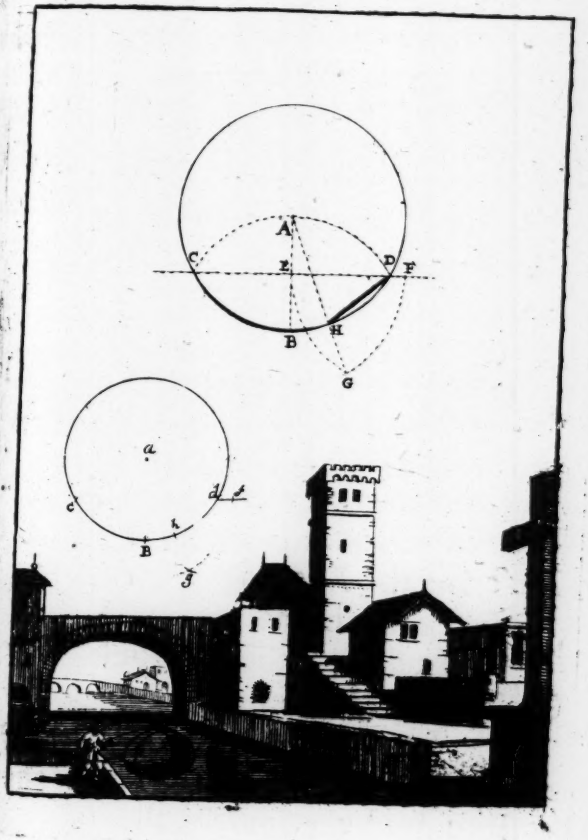
Within a Circle given to deſcribe an Enneagone.

Let B C D be a Circle propounded, within which one would inſcribe an Enneagone.

The Practice.

DRaw the half Diameter A B
From the end B.
And from the Interval, B A.
Deſcribe the Arch C A D.
Draw the right line C D.
Enlarged towards F.
make the line E F.
Equal to the line A B.
from the Point E.
Deſcribe the Arch F G.
from the Point F.
Deſcribe the Arch E G.
Draw the right line A G.
D H, ſhall be the Ninth Part of the Circumference.

PRO


A
C
Z
D
F
B
H
G
a
c
d
e
b
B
f

PROPOSITION VI.

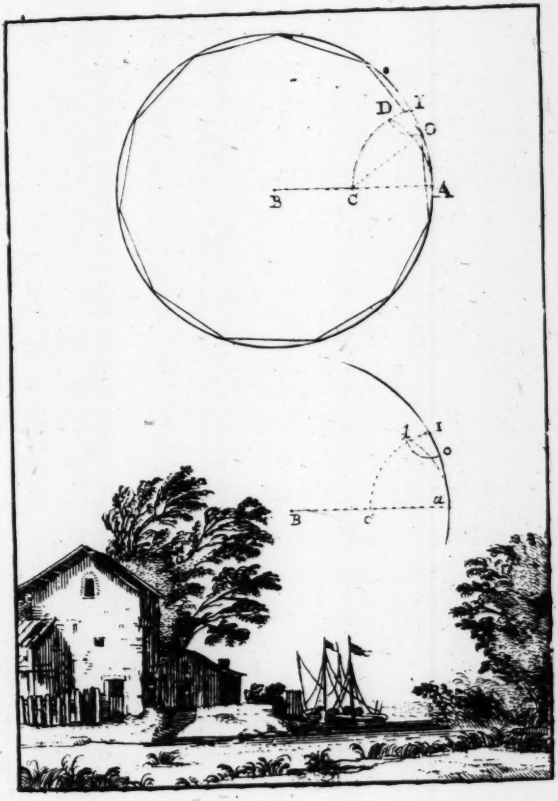
Within a Circle given to Inſcribe an Endecagone.

Let A E F be the Circle given within which we muſt Inſcribe an Endecagone.

The Practice.

DRaw the half Diameter A B.
Divide the half Diameter A B.
into two Equally in C.
from the Points A & C.
and from the Interval A C.
Deſcribe the Arches *C D I, A D.*
From the point I.
And from the Interval *I D.*
Deſcribe the Arch *D O.*
The Interval *C O.*
Shall be the ſide of the Endecagone.
Required very punctually.

PRO-


D
I
O
B
C
A
I
O
B
C
a

PROPOSITION VII.

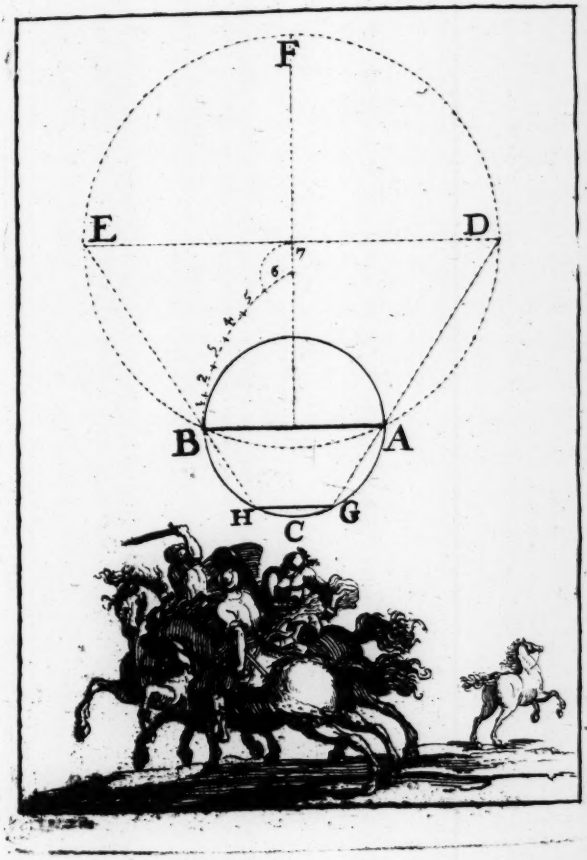
Within the Circle given to inſcribe ſuch a Poligone as one would.

Let A B C be a Circle within the which one would inſcribe an Eptagone

The Practice.

Draw the diameter A B.
Pag. 36, 38 4°. Deſcribe the Circle A B F.
Capable to contein ſeven times A B.
As if you would frame upon A B.
A Poligone like to that which you ſhould inſcribe within the Circle given A B C.
Draw the Diameter D E.
Parallel to the Diameter A B.
Draw the right lines D A G, F B H.
By the ends D A, E B.
G H ſhall divide the Circle given A B C.
Into ſeven equal parts.
And ſo of all other Poligones.

PRO-


F
E
D
B
A
H
C
G

PROPOSITION VIII.

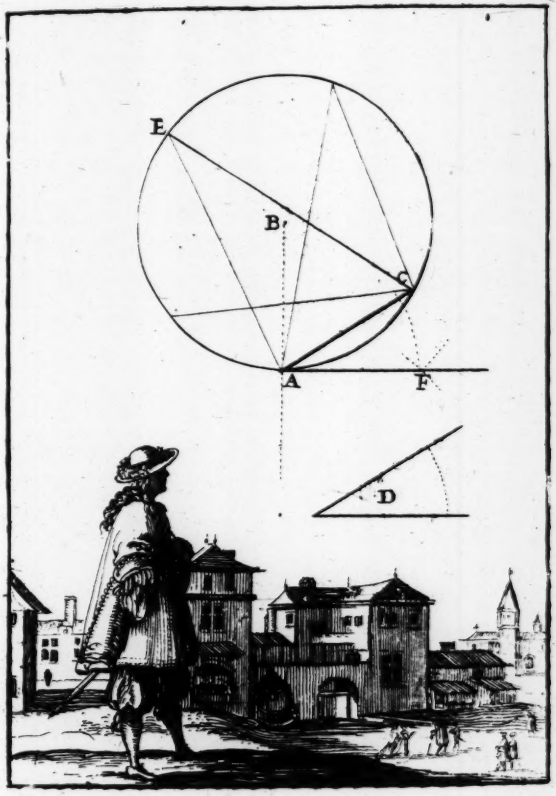
From a Circle given, to take a Portion Capable of an Angle, equal to an Angle Rectilinear propounded.

Let A C E be the Circle given from which we muſt take a Portion capable to contein an Angle equal to the Angle *D.*

The Practice.

Draw the half diameter *A B.*
Page 22. Bring the line touching *A F.*
Make the Angle F A C.
Equal to the Angle given D.
All the Angles which ſhall be
Framed upon the line *A C.*
And within the portion *A E C.*
Shall be all equal to the Angle given *D.*
So the portion *A E C.*
Is the required.

PRO-


E
B
C
A
F
D

PROPOSITION IX.

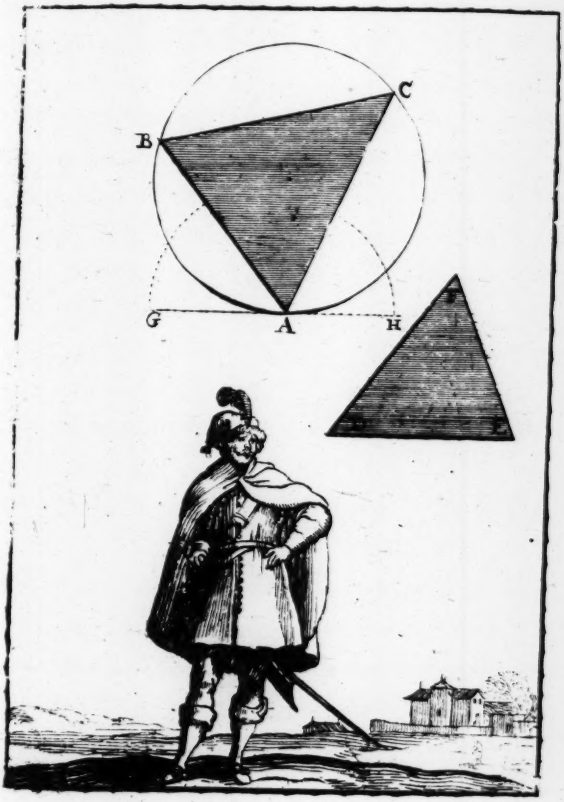
Within a Circle to inſcribe a Triangle of equal Angles to a Triangle given.

Let *A B C* be the Circle within, the which we muſt inſcribe a Triangle like to the Triangle *D E F.*

The Practice.

Page 22. Bring the line touching G H.
From the point of the Touching A.
Page 15. Make the Angle *H A C.*
Equal to the Angle *E.*
Make alſo the Angle *G A B.*
Equal to the Angle *D.*
Draw the line *B C.*
A B C is the Triangle required like to the Triangle given *D E F.*

PRO-


C
B
G
A
H

PROPOSITION X.

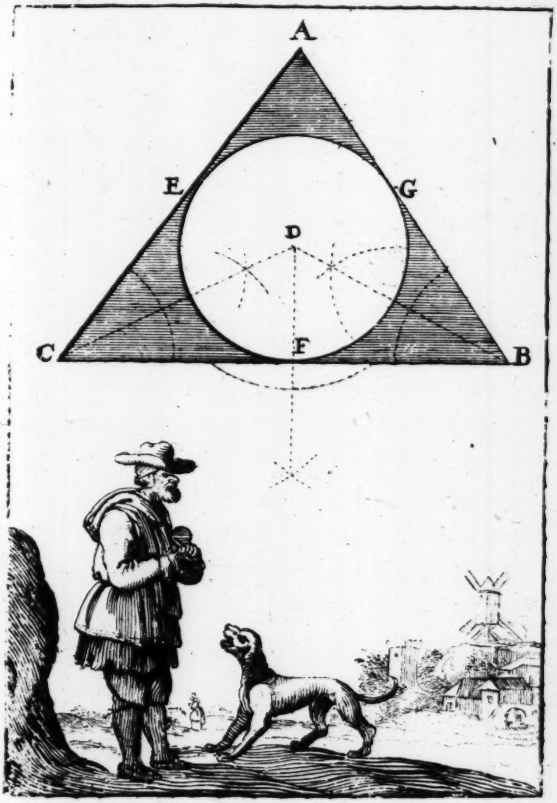
To inſcribe a Circle within a Triangle given.

Let *A B C* be the Triangle, within the which we muſt inſcribe a Circle.

The Practice.

Page 14. Divide the two Angles *B* & *C*.
Each into two equally
By the right lines *B D*, *C D*.
From the ſection *D*.
Page 8. Bring down the Perpendicular *D F*.
From the ſection or Center *D*.
And from the Interval *D F*.
Deſcribe the Circle demanded. *E F G*.

PRO-


A
E
G
D
C
F
B

PROPOSITION XI.

To inſcribe a Square within a Triangle given.

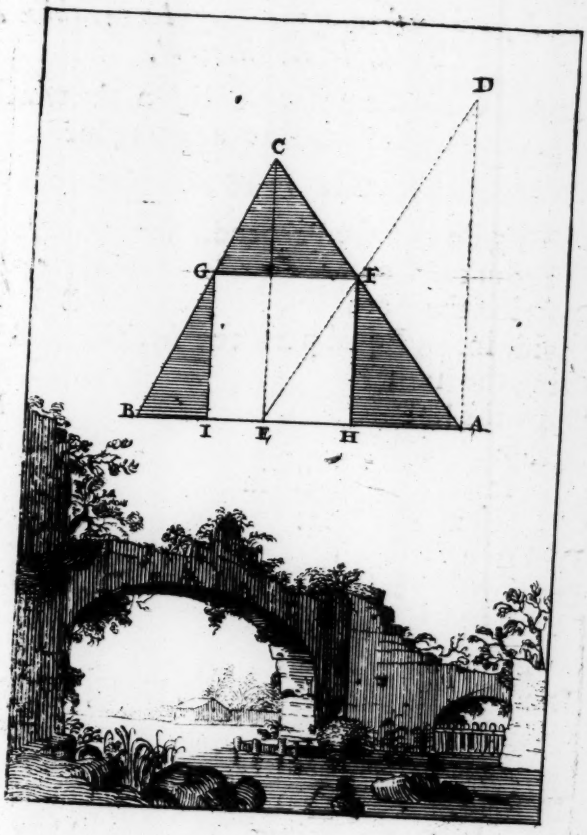
Let A B C be the Triangle, within the which we muſt inſcribe a ſquare.

The Practice.

Elevate the Perpendicular	*A D.*
At the end of the Baſis	*A B.*
Make this Perpendicular	*A D.*
Equal to the baſis	*A B.*
From the Angle	*C.*
Draw the line	*C E.*
Parallel to the line	*A D.*
Bring the oblique line	*D E.*
From the ſection	*F.*
Draw the line	*F G.*
Parallel to the baſis	*A B.*
Draw the lines	*F H, G I.*
Parallel to the line	*C E.*

F G H I ſhall be the Square required.

PRO-


D
C
G
F
B
I
E
H
A

PROPOSITION XII.

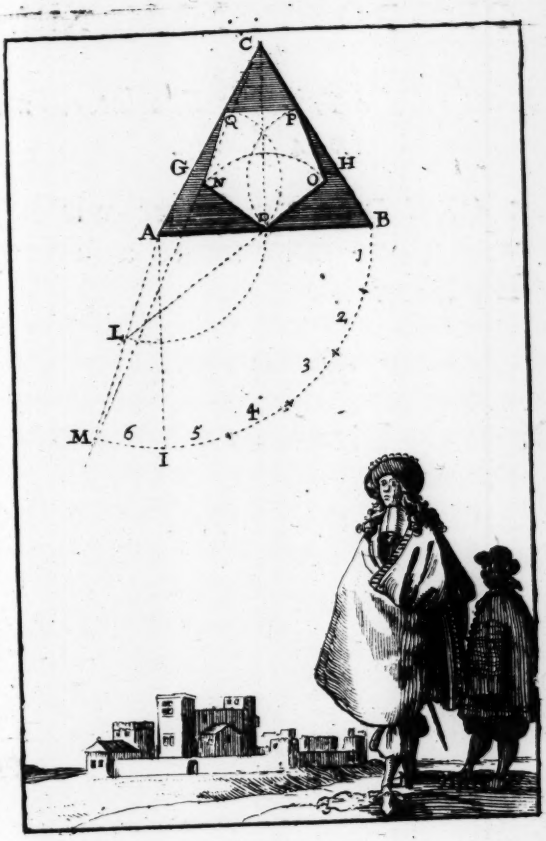
To Inſcribe a Pentagone Regular within a Triangle Equilateral.

Let A B C be the Triangle within the which one would Inſcribe a Pentagone.

The Practice.

BRing downe the Perpendicular A I.
From the Center A.
Deſcribe the Arch B I M.
Divide into 5 Equal parts the Arch B I.
Bring the ſixth I M.
Draw the line A M.
Divide A M.
into two Equally in L.
from the Point A.
Deſcribe the Arch L D.
Draw the right line L D, unto H.
Make the part A G,
Equal to the Part B H.
Draw the right line D G, M C.
from the Center D.
and from the Interval of the ſection N.
Deſcribe the Arch N O.
from the Points N & O.
Deſcribe the Arches D Q, D P.
Draw the lines O P, P Q, N Q.
D O P Q N ſhall be the Pentagone required.

PRO-


C
Q
P
G
N
O
H
A
B
1
2
3
4
5
6
L
M
I

PROPOSITION XIII.

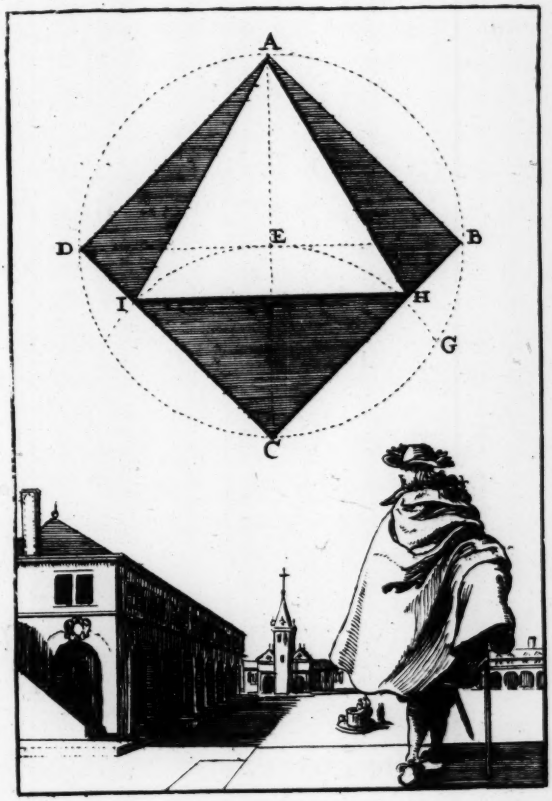
To inſcribe a Triangle Equilateral within a ſquare.

Let *A B C D* be the ſquare within the which we muſt make a Triangle Equilateral.

The Practice.

Draw the Diagonals *A C, B D.*
From the Center *E.*
And from the Interval *E A.*
Deſcribe the Circle *A B C D.*
From the point *C.*
And the Interval *C E.*
Deſcribe the Arch *G E F.*
Draw the right lines *A F, A G.*
Bring the right line *H I.*
A H L ſhall be the Triangle Equilateral required.

PRO-


A
D
E
B
I
H
G
C

PROPOSITION XIV.

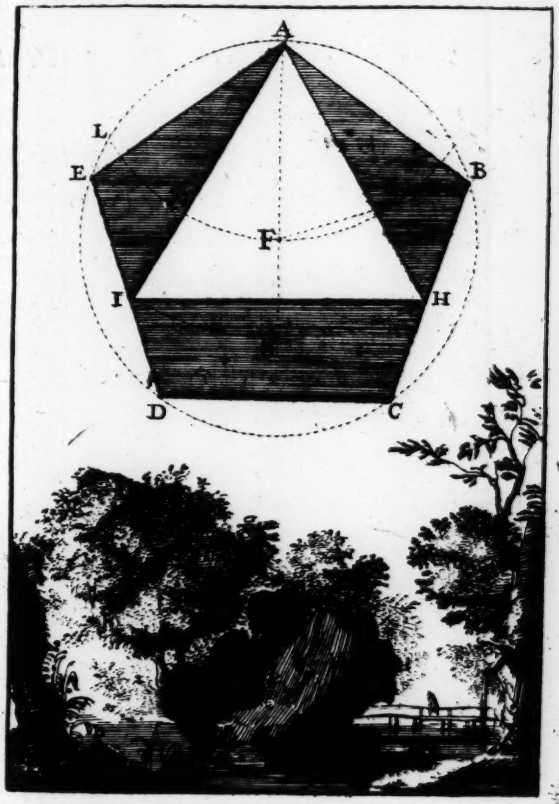
To inſcribe a Triangle Equilaterall within a Pentagone

Let A B C D E be the Pentagone within the which we muſt inſcribe a Triangle Equilateral.

The Practice.

Page 50 CIrcumſcribe the Circle A B C D E.
from the Point A.
and from the Interval of the halfe Diameter A F.
Deſcribe the Arch F L.
Divide this Arch F L.
into two Equally in N.
Draw the Line A N I.
From the Point A.
and from the Interval A I.
Deſcribe the Arch I O H.
Draw the lines A H, H I.
A H I ſhall be the Triangle demanded.

PRO-


A
L
E
B
F
I
H
D
C

PROPOSITION XV.

To Inſcribe a Square within a Pentagone.

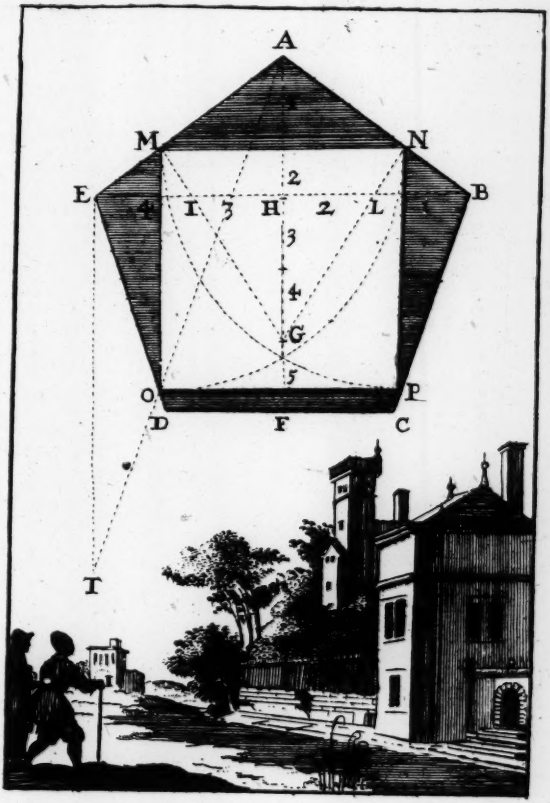
Let *A B C D E* be the Pentagone, within the which we muſt inſcribe a Square.

The Practice.

Draw the right line	*B E.*
Let down the Perpendicular	*E T.*
At the end of	*B E.*
Make this Perpendicular	*E T.*
Equal to the line	*B E.*
Draw the line	*E T.*
From the ſection	*O.*
Bring the line	*O P.*
Parallel to the ſide	*C D.*
At the end	*O P.*
Elevate the Perpendiculars	*O M, P I.*
Draw the line	*N M.*

N M O P ſhall be the Square required.

PRO-


A
M
N
E
B
2
4
1
3
H
2
L
3
4
G
5
O
P
D
F
C
T

THE FOURTH BOOK OF THE *Circumſcription of* FIGURES.

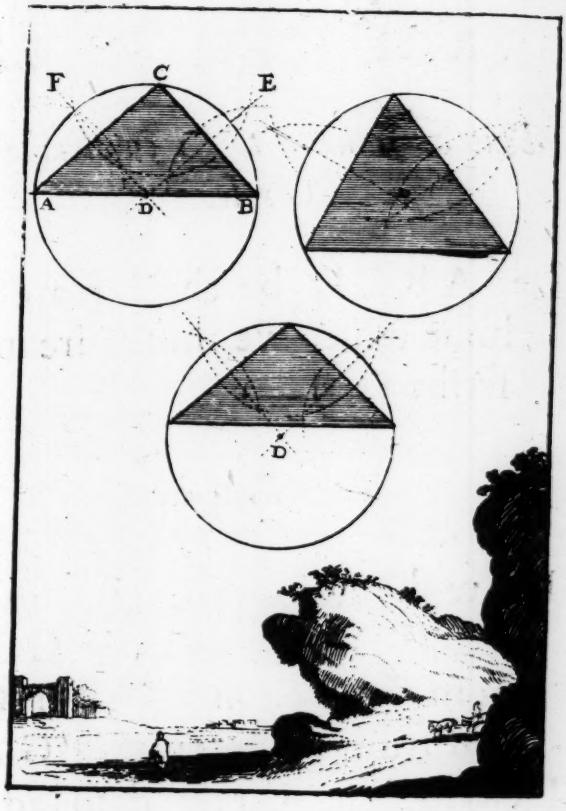
PROPOSITION I.

About a Triangle given to Circumſcribe a Circle.

Let A B C be the Triangle about The which one would Circumſcribe a Circle.

The Practice

Page 50 DEſcribe the Circumference A B C. by the three Points A, B, C. and you ſhall have the demanded PRO-


F
C
E
A
D
B
D

PROPOSITION II.

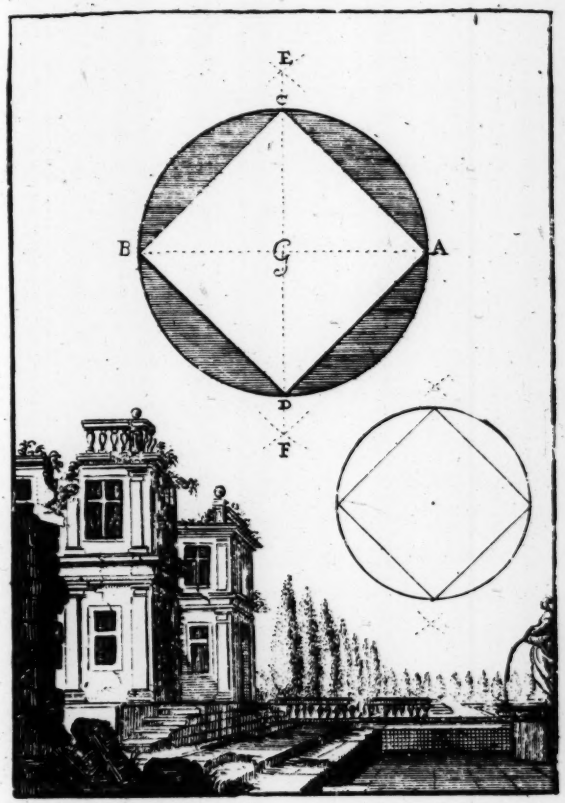
About a Square to Circumſcribe a Circle.

Let A B C D be the Square about which we muſt Circumſcribe a Circle.

The Practice.

Draw the two Diagonals A B C D.
From the Section or Center G.
And from the Interval G A.
Deſcribe the Circle demanded A B C D.

PRO


E
C
B
G
A
D
F

PROPOSITION III.

About a Circle to circumſcribe a Triangle of equal Angles to a Triangle given.

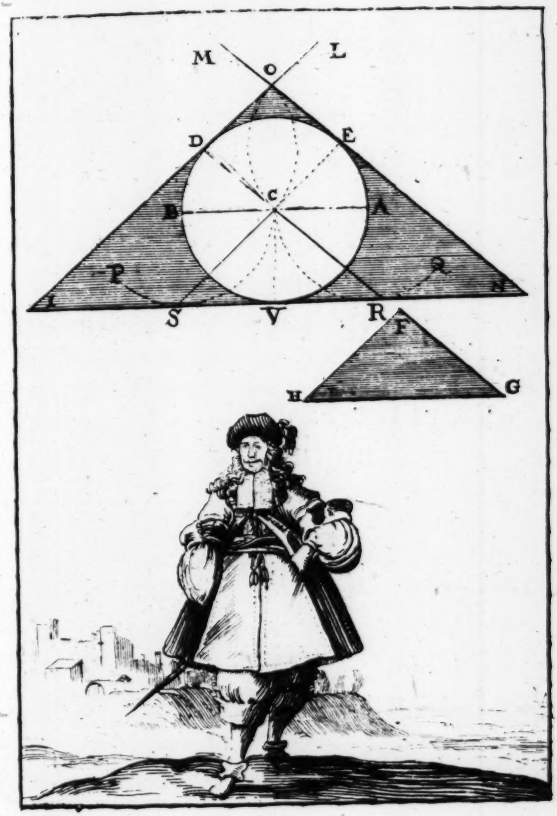
Let D E V be the Circle about the which we which we muſt make a Tria gle which may be like to the Triangle *F G H.*

The Practice.

Draw the diameter	*A B.*
By the Center	*C.*
Make the Angle	*A C E.*
Equal to the Angle	*H.*
Make the Angle	*B C D.*
Equal to the Angle	*G.*
Prolong the lines	*E C, D C.*
Towards	*R & S.*
Draw the line Tangent	*N O.*
Parallel to the line	*D R.*
Draw the line Tangent	*O I.*
Parallel to the line	*E S.*
Draw alſo the line Touchant	*N I.*
Parallel to the Diameter	*A B.*

IN O ſhall be the Triangle demanded like to the Triangle F G H, circumſcribed about the Circle. D E V.

PRO-


M
O
L
D
E
C
B
A
P
Q
I
S
V
R
N
F
H
G

PROPOSITION IV.

About a Circle to Circumscribe a Square

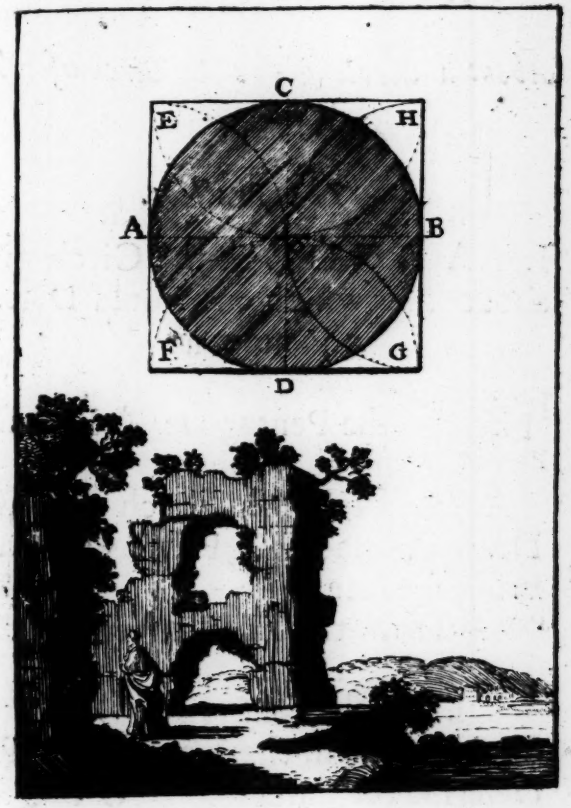
Let A B C D be the Circle about the which we must describe a Square.

The Practice.

DRaw the Diameters A B, C D. Dividing themselves at right Angle in O.

From the Points A, C, B, D,
And from the Interval A O.
Describe the demicircles H O G, H O E, E O F, F O G,
Draw the right lines E F, F G, G H, H, E,
by the Section E, F, G, H.
E F G H shall be the Square demanded

PRO-


C
E
H
A
B
F
G
D

PROPOSITION V.

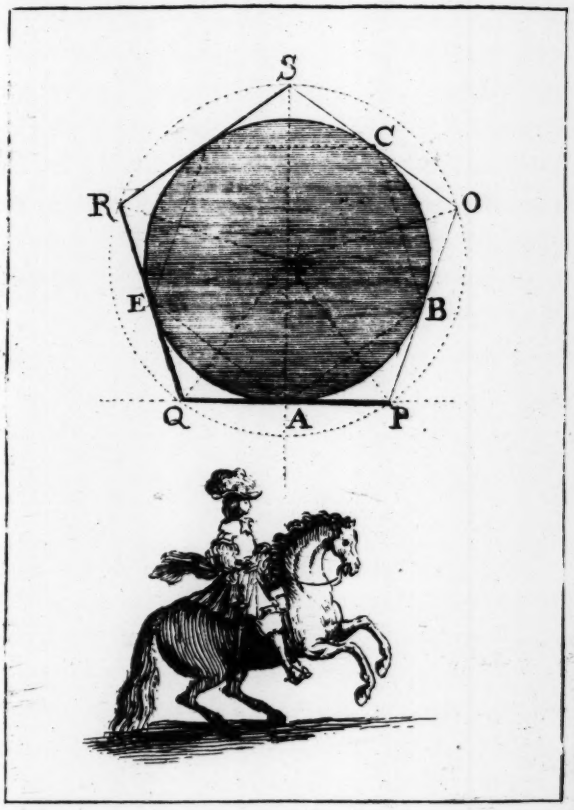
About a Circle given to Circumſcribe a Pentagone.

The Practice.

Let A B C D E be the Circle given about the which one would Deſcribe a Pentagone

INſcribe the Pentagone A B C D E.
Page 68. From the Center F.
And by the Midſt of Each of the ſides
Draw the lines F O, F P, F Q, F R, F S.
Bring the line F A.
Page 22. Draw the line Tangent P Q.
by the Point A.
From the Center F.
And from the Interval F. P.
Deſcribe the Circle O P Q R S.
Draw the ſides of the Pentagone demanded by the Section O P Q R S.

PRO-


S
C
R
O
E
B
Q
A
P

PROPOSITION VI.

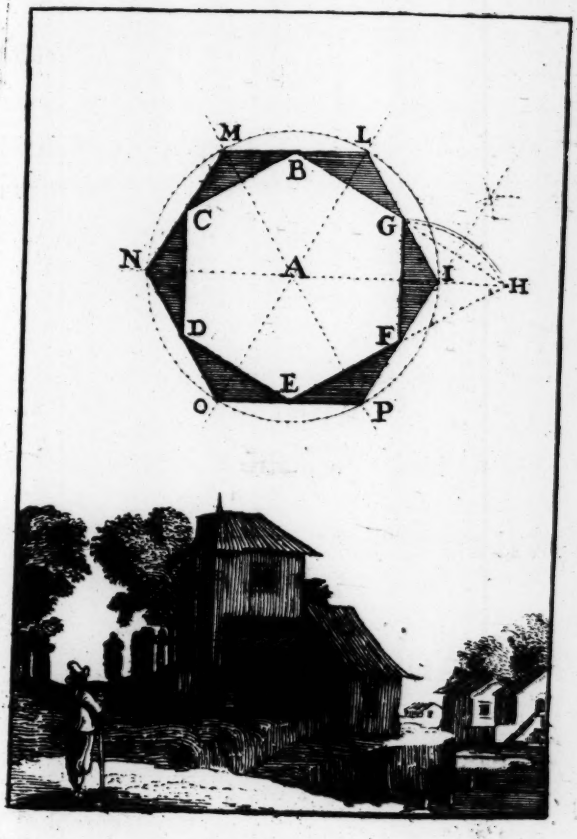
About a Poligone Regular to Circumſcribe The ſame Poligone.

Let B C D E F G be the Poligone given about the which we muſt Circumſcribe auother Poligone like.

The Practice.

PRolong two ſides as *B G E F.*
Unto the Point of the meeting H.
*D*raw the line *A H.*
Page 14 Draw the line F I.
*D*ividing the Angle G F H.
Into two Equally
From the Center A.
And From the Interval *A I.*
Deſcribe the Circle I M O.
Draw the Rayes A L, A M, A N, A O, by the midſt of Each ſides.
Draw the ſides of the Outward Poligone demanded by the Sections I L M N O P.

PRO-


M
L
B
C
G
N
A
I
H
D
F
E
O
P

PROPOSITION VII.

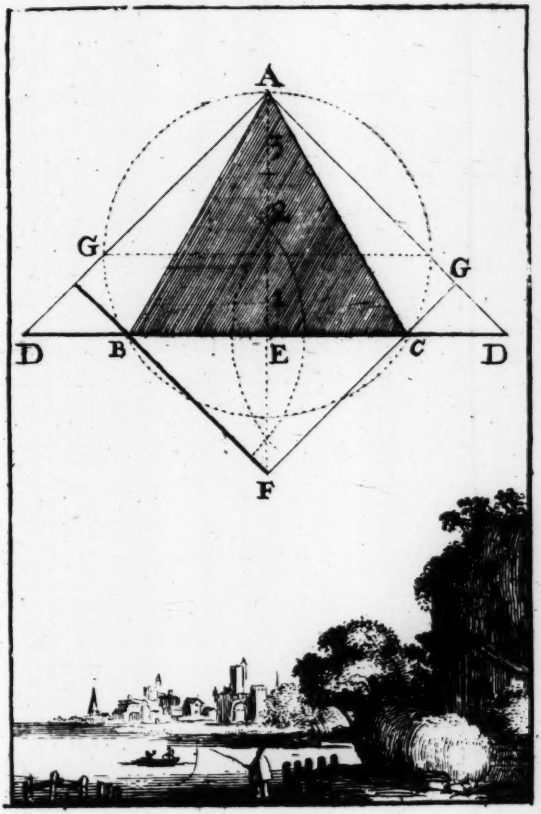
About a Triangle Equilateral to Circumframe a Square.

Let A B C be a Triangle Equilateral about the which we muſt Cricumſcribe a Square.

The Practice

DIvide the Baſis B C.
Into two Equally in E.
Prolong this Baſis B C.
the one part and the other towards D & D.
Make the Lines E D, E D.
Equal to the Line E A,
From the Point E.
And from the Interval E C.
Deſcribe the demy-Circle B F C.
Draw the Line A E F.
From the Point F.
Draw the Lines F C G, F B G.
A G F G ſhall be the Square demanded

PRO-


A
G
G
D
B
E
C
D
F

PROPOSITION VIII.

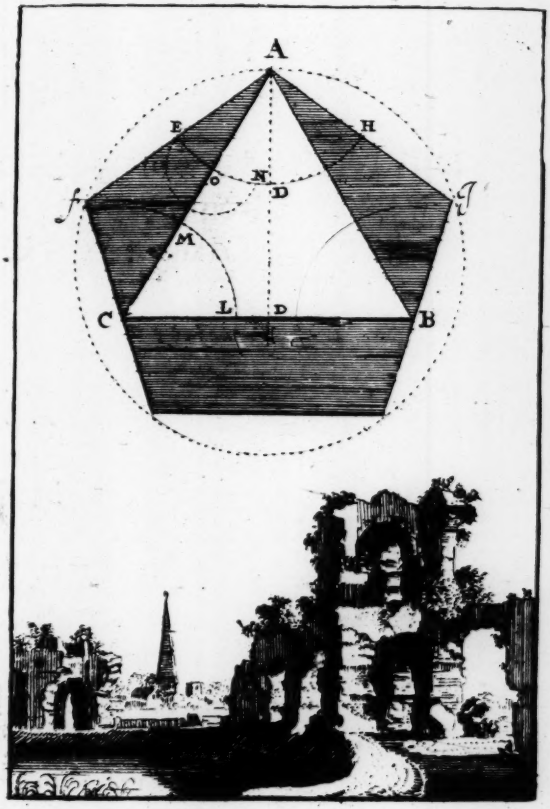
About a Triangle given Equilateral to Circumscribe a Pentagone.

Let A B C be the Triangle given about the which we must describe a pentagone.

The Practice

FRom the Point or Angle A B C.
And with the same opening of the Compasses describe at discretion the Arch D E, L P
Divide the Arch D O.
Into five Equal Parts 1 2 3 4 5.
From the Center or Section O.
And from the Interval of 4 Parts O N.
Describe the Arch N M E.
Draw the right line A E F.
Divide the Arch M P.
Equal to the Arch E N.
Draw the right line F P C G.
Equal to the line F A.
Make the Arch *D H*
Equal to the Arch *D E.*
Draw the sides A I, I R.
Equal to the sides A F, F G.
The side G R.
shall finish the Protagone demanded

PRO-


A
E
H
G
N
D
f
I
M
C
L
D
B

PROPOSITION IX.

About a Square to Circumſcribe a Triangle of equal Angles to a Triangle given.

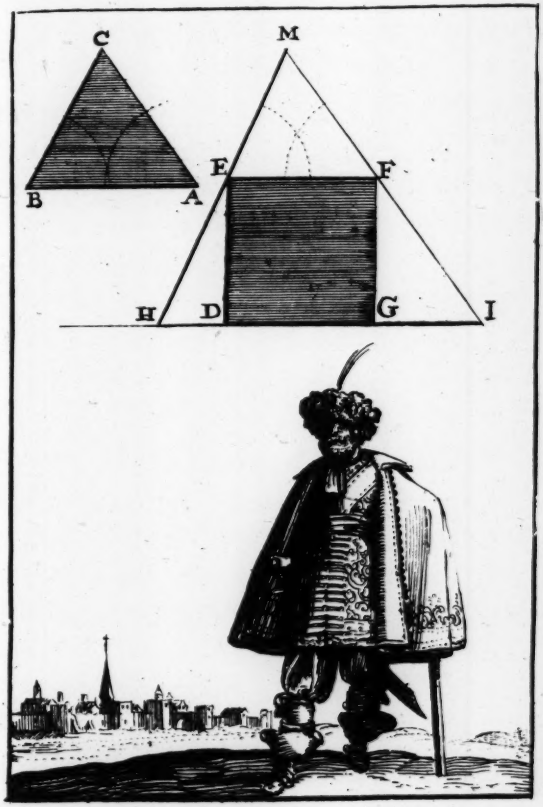
Let D E F G be the Square about the which we muſt Circumſcribe a Triangle like to the Triangle A B C.

The Practice

MAke the angle E F M,
Equal to the Angle A.
Make the Angle M E F.
Equal to the Angle B.
Prolong the Lines M E, M F, D G,
towards I & H.

M I H ſhall be the Triangle required,
like to the Triangle A B C.
and Circumſcribe about the Square
given D E F G.

PRO-


C
M
E
F
B
A
H
D
G
I

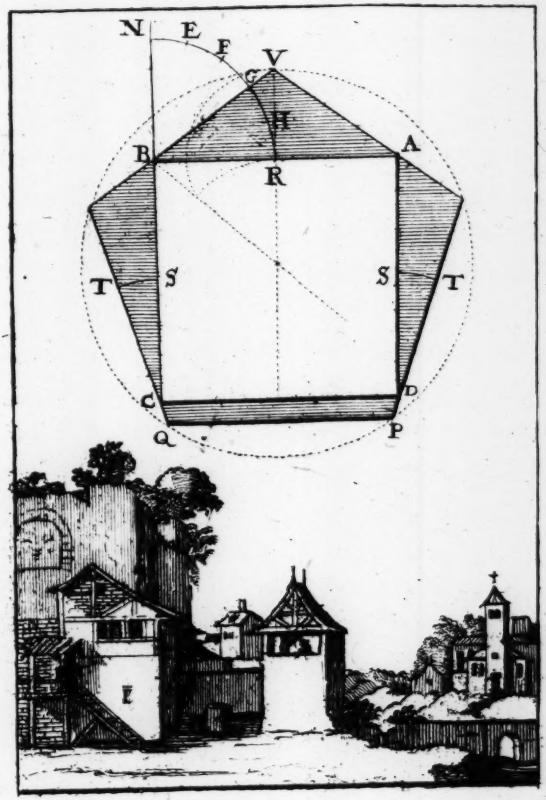
PROPOSITION X.

About a Square to Circumscribe a Pentagone.

Let A B C D be the Square about the which we must Circumscribe a Pentagone.

The Practice

PRolong the side C B.
towards N.
Divide the side A B.
Into two Equally in R.
Elevate the Perpendicular R V.
From the Points B, D, C.
And from the same Interval B R
Divide the Arches R N, S T, S T,
Divide the Arch R N.
Into 5 Equal parts R H, G F E N.
Make the Angle R B V.
from the Opening of 2 parts R G.
Make the Angles S C T, S D T
From the Opening of one part R H.
Prolong the lines V B, C T in O.
Make the line O Q.
Equal to the line O V.
Draw the other sides on the same manner,
And you shall have the demanded PRO-


N
E
F
V
C
H
B
A
R
T
S
S
T
C
D
Q
P

THE FIFTH BOOK OF THE *Lines* PROPORTIONAL.

PROPOSITION I.

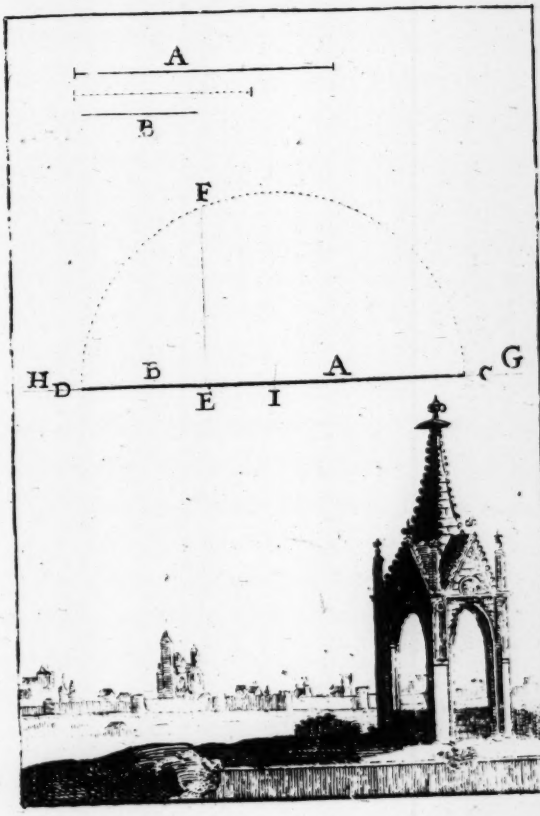
To finde a line which may be a mean Proportional between two others.

Let A & B be the lines between the which we muſt finde a third which may be Proportionall to them:

The Practise.

DRaw a line Undeterminate G H.
Make C E.
Equal to the line A.
Make E D.
Equal to the line B.
Divide C D.
Into two Equally in I.
From the Point I.
And from the Interval I C,
Deſcribe the demy-Circle C F D.
Elevate the Perpendicular E F.
This Line E F.
ſhall be the MeanProportional between A & B, According as it is Propounded.

PRO-


A
B
F
H
D
B
A
G
E
I

PROPOSITION II.

There being given the Summe of the Extremes and the Mean Proportionall to discerne the Ends and Extreames.

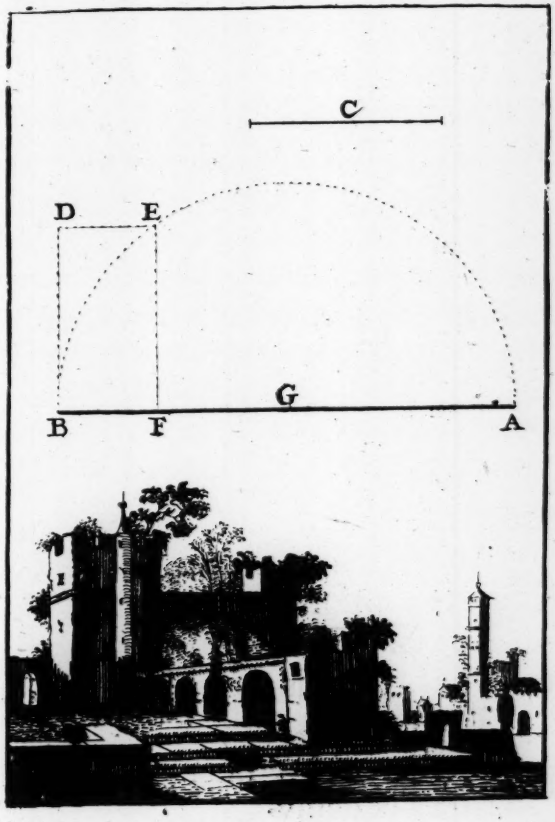
Let A B be the ſumme of the Ends, that is to ſay, two Grandeurs (or Greatneſses the one at the End of the other without diſtinction) whereof the line C is the Mean Proportionall and by the means of which we muſt find the point where the Extremes or Ends do joyn themſelves

The Practice

Divide the Summe or the line	A B:
Into two Equally in	G.
From the Point	G.
And from the Interval	G A.
Deſcribe the Demy-Circle	A E B.
Elevate the perpendicular	B D.
Equall to the meane	C.
Draw the line	D E.
Parallel to the line	A B.
from the Section	E.
Draw the line	E F.
Parallel to the line	B D

F ſhall be the point where the Extremes joyne themſelves, and ſo C or his Equal E F. ſhall be the mean between the extremes A F, & F B.

PRO-


C
D
E
G
B
F
A

PROPOSITION III.

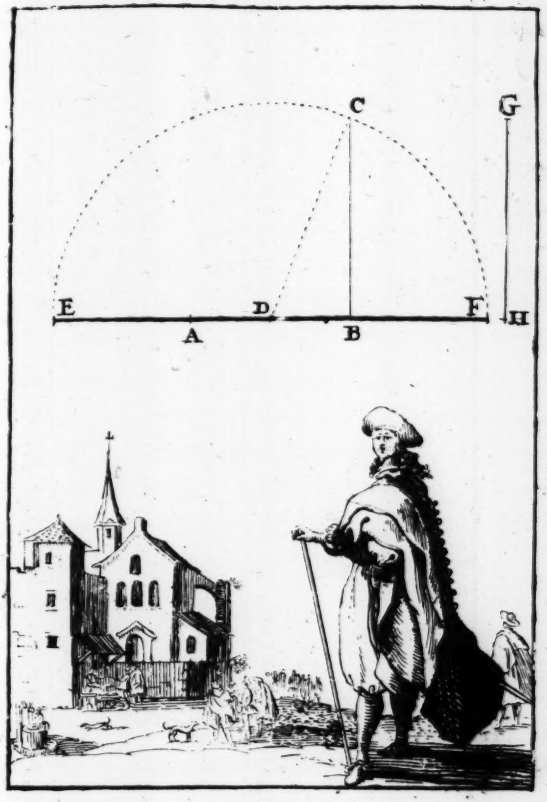
There being given the Mean of three Proportionals, And the difference of the Extremes (or Ends) to find the Extremes.

Let G H be the Mean Proportionals and A B the difference of the Extremes, we muſt find the length of the Extremes.

The Practice.

ELevate the Perpendicular B C.
at the End of the difference A B.
And equal to the mean G H.
Divide the difference A B.
Into two Equally in D.
Prolong it towards E & F.
From the Point D.
And from the Interval D C.
Deſcribe the demy-Circle E C F.
B E, B F ſhall be the Extremes demanded

PRO-


C
G
E
D
F
H
A
B

PROPOSITION. IV.

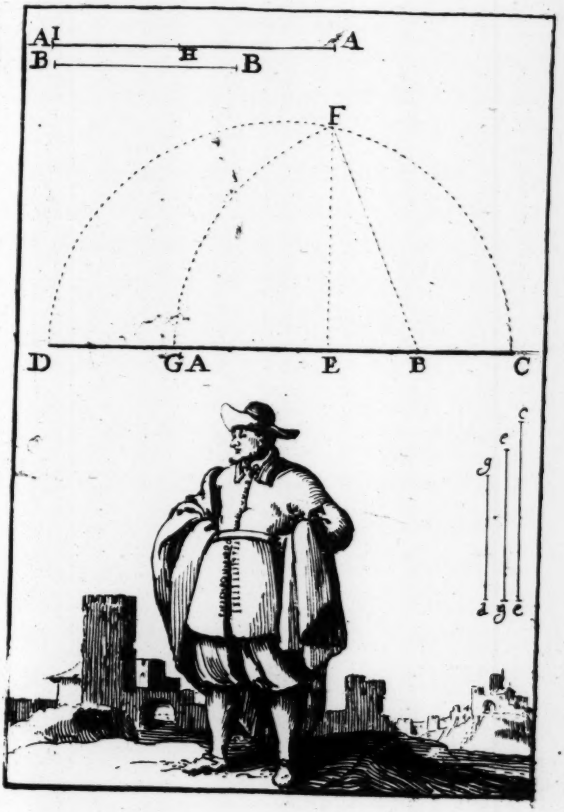
From a right line given, to Cut off a Part, which may be a mean Proportionall between the reſt and another right line Propounded.

Let *A A* be the line, from the which we muſt Cut off a part, which may be the mean proportional between the Part that ſhall remain, and the line Propoſed B B.

The Practice.

DRaw the line Indeterminate	C D.
Divide the lines D E,	E C.
Equal to the lines	*A A & B B.*
Deſcribe the Demy-Circle	C F D.
Elevate the Perpendicular	E F.
Divide the line	C E.
into two Equally in	B.
From the Point	B.
And from the Interval	B F.
Deſcribe the *Arch*	F G.
Divide the Part demanded	A G.
Equal to the Part	E G.
A H ſhall be the mean Proportional between the reſt	H I.
And the other line propounded	B B.

PRO-


A I
A
B
H
B
F
D
G A
E
B
C
c
e
g
d
g
e

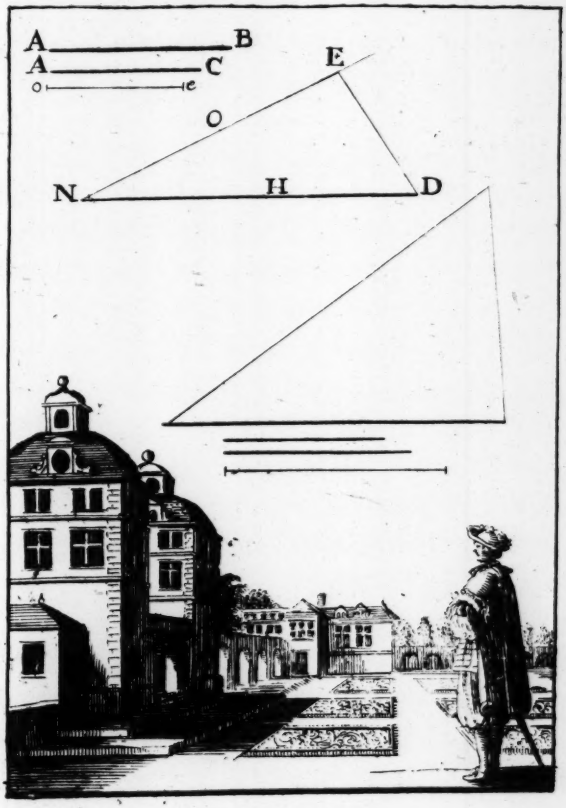
PROPOSITION V.

There being given two right lines, to find a Third Proportional.

A B, A C are the two right lines given, we muſt find a third which may be Proportional to them.

The Practice.

Make at diſcretion the Angle D N E.
Divide the Part N H.
Equal to the line A B.
Divide the Part N O.
Equal to the line A C.
Divide alſo H D.
Equal to the line A C.
Bring the line H O.
Draw the line D E.
Parallel to the line H O.
E O. ſhall be third Proportional demanded PRO-


A
B
A
C
E
O
N
H
D

PROPOSITION VI.

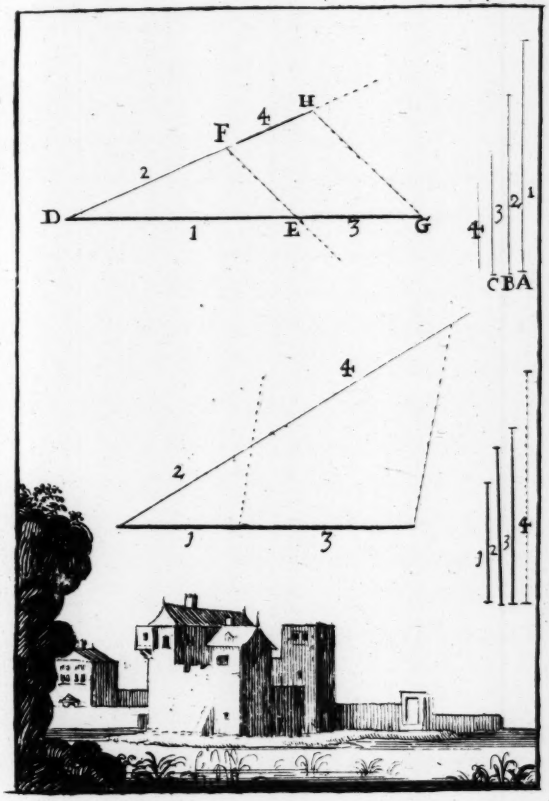
To finde a fowerth Proportional.

A, B, C, are the three lines, propoſied: we muſt finde a foerth which may be to the third, as the ſecond to the firſt.

The Practice

MAke at diſcretion the Angle G D H
Divide the Part D E.
Equal to the line A.
Divide the Part D F.
Equal to the line B.
Divide the Part E G.
Equal to the line C.
Bring the line E F.
Draw the line G H.
Parallel to the line E F.
F H ſhall be the fowerth Propotionall demanded,

PRO-


H
4
F
2
D
1
E
3
G
4
3
2
1
C
B
A
4
2
1
3
1
2
3
4

PROPOSITION VII.

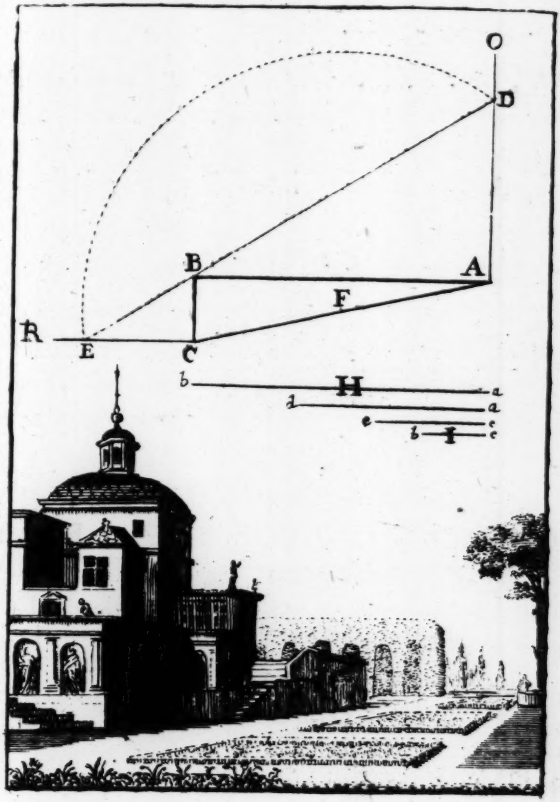
Between two right lines given to find two Means Proportional.

Let I & H be the lines Propounded between the which we muſt find two Means Proportional.

The Practice

DRaw the line A B.
Equal to the line H.
Let down the Perpendiculars B C.
Equal to the line I.
Bring the line A C.
Divide this line A C.
Into two Equally in F.
Elevate the Perpendiculars A O, C R.
from the Point or Center F.
Deſcribe the Arch D E.
In ſuch manner that the Coard D E.
Touch the Angle B.
A D, C E ſhall be the Means Proportional between the lines given I & H.

PRO-


O
D
B
A
F
R
E
C
b
H
a
d
a
e
c
f
I
c

PROPOSITION. VIII.

To divide two right lines given, Each into two Parts, ſo that the four ſegments may be Proportional.

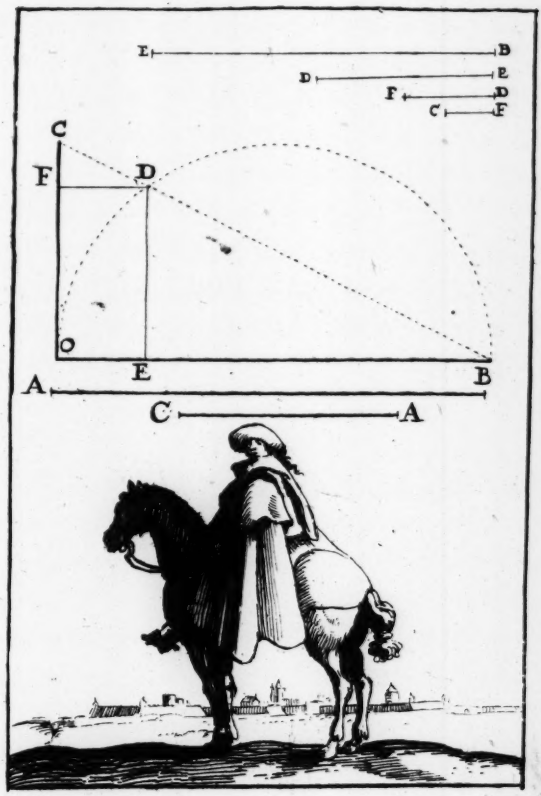
A B, A C are the lines Propounded to be

The Practice.

MAke the right Angle	B O C.
Divide the line	B O.
Equal to the line	A B.
Divide the line	O C.
Equal to the line	A C.
Bring the Subtendent	B C.
Deſcribe the demy-Circle	B D O.
From the ſection	D.
Bring the line	D E.
Parallel to the line	C O.
The line	D F.
Parallel to the line	E O.
A B ſhall be divided in	E.
O C ſhall be divided in	F.

So that B E ſhall be to E D as E D is to D F, & E D to D F as D F is to F C

PRO.


E
B
D
E
F
D
C
F
C
F
D
O
E
A
B
C
A

PROPOSITION IX.

There being given the Exceſſe of the Diagonal of a Square, about the ſide to find the greatneſs of the ſaid ſide.

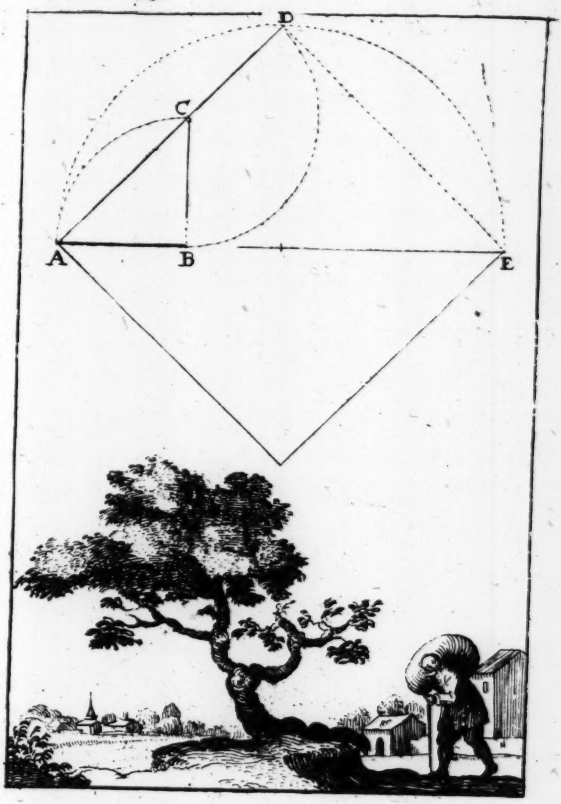
Let A B be the Exceſſe of the Diagonal of a ſquare, above its ſide whereof we muſt find the Greatneſs.

The Practice

ELevate the Perpendicular B C.
Equal to the Exceſſe B A.
Draw the line A C.
Prolonged towards D.
From the Point C.
And from the Interval C B.
Deſcribe the Arch B D.

A D ſhall be the ſide of the Square whereof A B is the Exceſſe of the Diagonal A E above the ſaid ſide A D.

PRO-


D
C
A
B
E

PROPOSITION X.

To divide a right line Terminated within the Mean and Extreme reason.

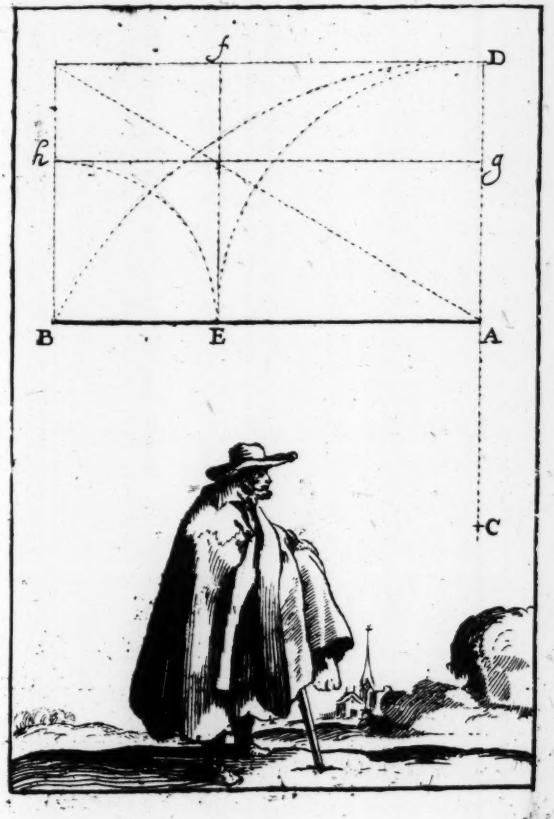
Let A B be the line, which we muſt divide in ſuch manner, as the Rectangle Compoſed of the whoſe line, and of one of the two Parts, may be Equal to the Square framed upon the other Part.

The Practice.

ELevate the Perpendicular	A D.
Prolong it towards	D
Make	A C
Equal to the halfe of	A B
From the Point	C.
And from the Interval	C B.
Deſcribe the Arch	B D
From the Point	A
And from the Interval	A D.
Deſcribe the Arch	E
The line	A B.
ſhall be divided in	E

According to the Propoſition, for if you make the Rectangle *A* H of the whole *A B* and of the Part B *E*, it ſhall be Equal to the Square *A F* framed upon the other Part *A E*.

PRO-



N 4

PROPOSITION XI.

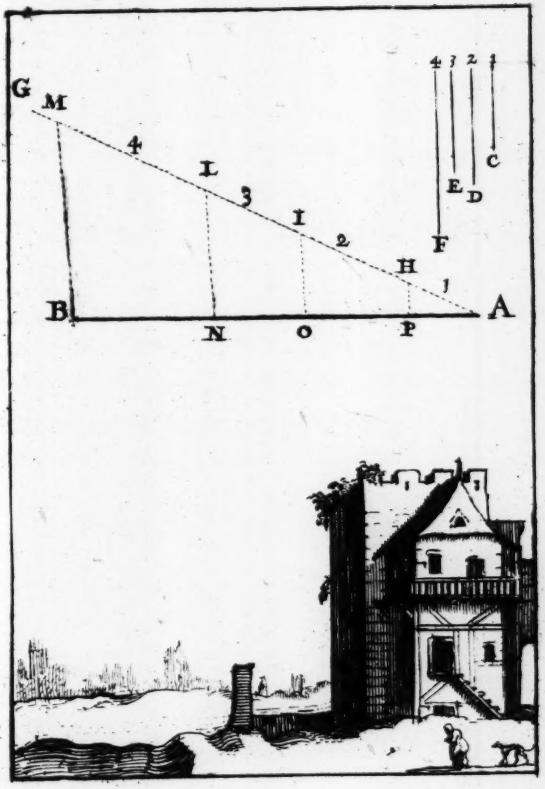
To divide a right line terminated according to the reasons given.

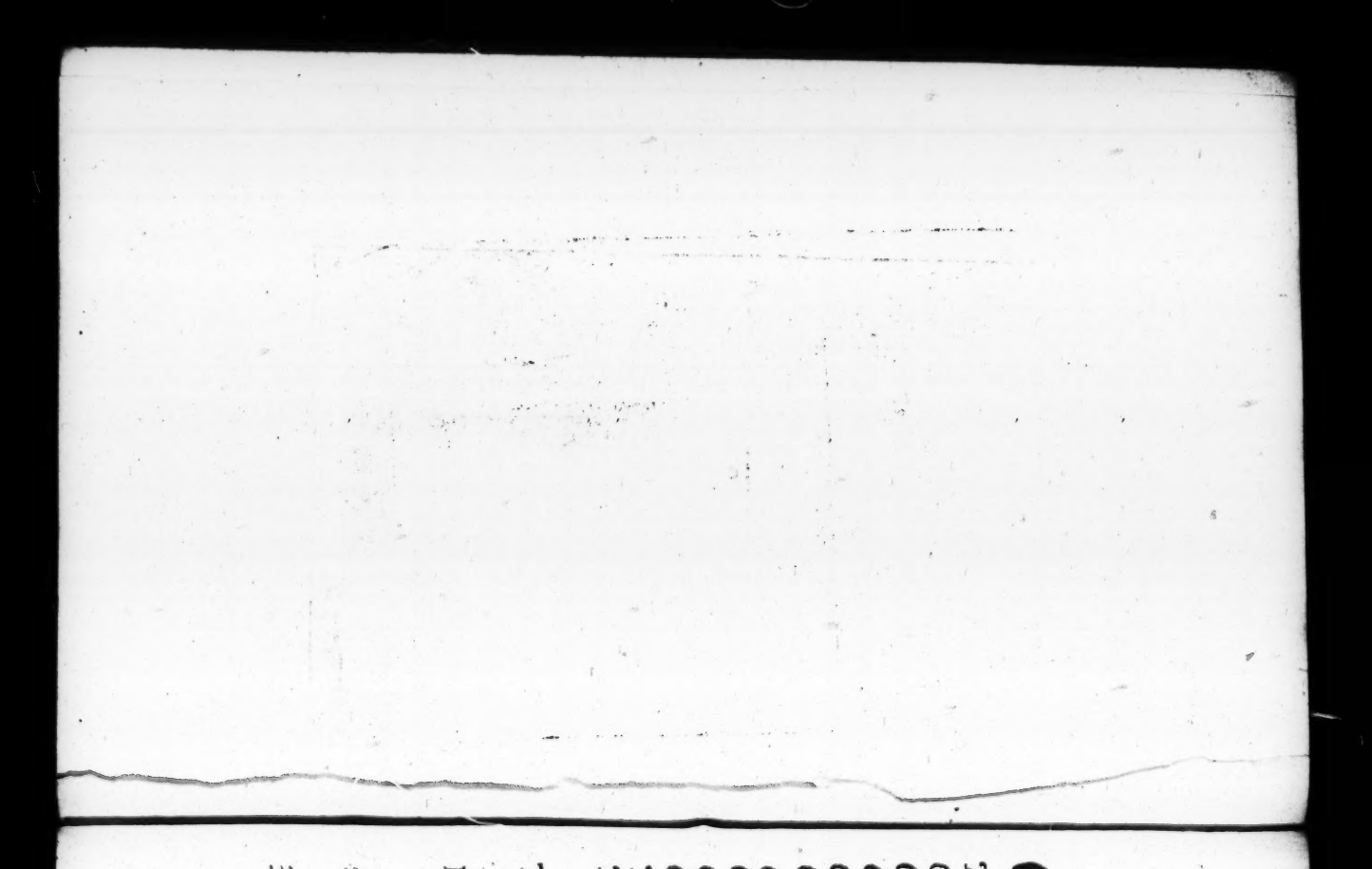
Let A B be the line Propounded to be divided according to the Reasons, *C. D. E. F.*

The Practice

From the Point or End A.
Draw at discretion the line A G.
Make A H.
Equal to the line or Reason C.
Make H I.
Equal to the line D.
Make I L.
Equal to the line E.
Make L M.
Equal to the line F.
Draw the line B M.
Bring the lines L N, I O, H P.
Parallels to the line B M.
The line A B shall be divided in the Points P O N, according as it is demanded

PRO-


G
M
4
L
3
I
2
H
1
B
N
O
P
A
4
3
2
1
E
D
C
F



THE

TABLE.

OF *Geometry in Generall. pag.* 1. *of its Originall, and Profitableneſs.*

The Principles of Geometry, 1

Of a Point, 3

Of the Line. 5

Of the Angle. 12

Of the Superficies 14

Of figures Rechlinear. 16

Of figures of fower ſides. 18

Of figures Crooked, or Curvi-linear 20

Of figurer Compounded 22

Of figures Regular and Irregular. 24

The Axioms. 28

The Petitions or Demands ſerving for Ordering of the Practice. 34

The FIRST BOOK of the Deſcription of LINES. 39

Propoſition I. *To elevate a Perpendicular from a Point propounded within the midſt of a Right line.* 40.

2. *To Elevate a Perpendicular at the End of a Right Line Propounded.* 42

3. *Upon an Angle given to elevate a right Line, which inclineth neither to the right ſide nor left* 44

4. *To abaſe or let down a Perpendicular line upon a right line given, and from a Point without it.* 46

5. *By a Point given to draw a Line Parallel to a right line given.* 48

6. *To divide a right line given, and bounded into two equally.* 50

7. *To divide an Angle Rectilinear given into two equally.* 52

8. *At the end of a right line to make an Angle Rectilinear propounded.* 54

9. *To divide a right line into as many equal Parts as one would.* 56

10. *From a Point given to draw a line, which toucheth a Circle Propounded.* 58

11. *To draw a right Line which toucheth a Circle at a Point propounded.* 60

12. *A Circle being given, and a right line that toucheth it, to find the Point of the touching.* 62

13. *To deſcribe a line Spiral upon a right line given.* 64

14. *Between two Points given to finde two other Points directly interpoſed.* 66

The Second Book of the plain Conſtruction of Figures.

PROPOSITION I. *To frame a Triangle Equilateral, upon a right line given and bounded.* 70

2. *To make a Triangle of three right lines equal*

equal to three right lines given. 72
3. *To frame a Square upon a right line given and bounded.* 74
4 *To frame a* Pentagone *(or five Angles) Regular, upon a right line given.* 76
5. *To frame an* Hexagone *(or six Angles) Regular upon a right line given.* 78
6. *Upon a right line given, to describe such a* Poligone *(as one would) from the* Hexagone *to the* Decagone *(or ten Angles)* 80
7. *Upon a right line to frame such a* poligone *as one would from* 12 *unto* 24 *sides.* 82
8. *Upon a right line given to describe a portion of a Circle, capable of an Angle equal to an Angle given.* 84
9. *To finde the Center of a Circle given.* 86
10 *To finish a Circumference begun where the Center is lost.* 88
11. *To describe a Circumference by three Points given.* 90
12. *To describe an Oval upon two Diameters given.* 92
13. *To finde the Center and the two Diameters of an Oval.* 96
14. *To frame a Figure rectilinear upon a right right line bounded, like to a Figure rectilinear propounded.* 98
15. *Upon a right line propounded to frame two Rectangles according to one reason given.* 102

The Table.

The Third Book of the Inſcription of Figures.

PROPOSITION I. *Within a Circle given to inſcribe a Triangle Equilateral, an* Hexagone *and a* Dodecagone. 106

2. *Within a Circle given to inſcribe a Square and an* Octogone *(or eight Angles)* 106

3. *Within a Circle given to inſcribe a* Penta- *and a* Decagone. 108

4. *Within a Circle given to inſcribe an* Epta-gone. 110

5. *Within a Circle given to inſcribe an* Enea-gone. 112

6. *Within a Circle given to inſcribe an* Ende-cagone. 114

7. *Within a Circle given to inſcribe ſuch a* Po-ligone *as one would.* 116

8. *From a Circle given to take away a Portion capable of an Angle equal to an Angle Rectilinear propounded.* 118

9. *Within a Circle to inſcribe a Triangle of equal Angles to a Triangle given.* 120

10. *To inſcribe a Circle within a Triangle given* 122

11. *To inſcribe a Square within a Triangle given.* 124

12. *To inſcribe a* pentagone *Regular within a Triangle Equilateral.* 126

13. *To inſcribe a Triangle Equilateral within a Square.* 128

14. *To*

14. *To inſcribe a Triangle Equilateral within a* pentagone. 130
15. *To inſcribe a Square within a* pentagone. 132

The Fourth Book of the Circumſcription of Figures.

PROPOSITION I. *About a Triangle given to circumſcribe a Circle.* 136
2. *About a ſquare to circumſcribe a Circle.* 138
3. *About a Circle to Circumſcribe a Triangle of equal Angles to a Triangle given.* 140
4. *About a Circle to Circumſcribe a Square.* 142
5. *About a Circle to Circumſcribe a* Pentagone. 144
6. *About a* Poligone *Regular to circumſcribe the ſame* Poligone. 146
7. *About a Triangle equilateral to circumſcribe a Square.* 148
8. *About a Triangle Equilateral to circumſcribe a* pentagone. 150
9. *About a Square to circumſcribe a Triangle of equal Angles to a Triangle given.* 152
10. *About a Square to circumſcribe a* pentigone. 154

The Fifth Book of Lines proportional.

PROPOSITION I. *To find a line which may be a mean Proportional between two others.* 158
2. *The ſum of the Extremes (or Ends) being given, and the Mean proportional to diſcern the*

Extremes. 160

3. *The Mean of three Proportionals being given, and the difference of the Extremes to find the Extremes.* 162

4. *Of a right line given, to cut off a Part, which may be a Mean Proportional between the reſt, a right line propounded.* 164

5. *Two right lines being given, to find a third proportional.* 166

6. *To find a fourth proportional.* 168

7. *Between two right lines given to finde two Means proportional.* 170

8. *To divide two right lines given, each into two Parts, ſo that the four Segments may be proportional.* 172

9. *The Exceſs of a Diagonal of a Square being given above the ſide, to find the greatneſs of the ſaid ſide.* 174

10. *To divide a right line bounded within the Mean and the Extreme reaſon.* 176

11. *To divide a right line bounded according to the Reaſons given.*

FINIS.

Several BOOKS of Architecture, *printed for* Robert Prick, *and are to be ſold as in the Title.*

A New Treatiſe of *Architecture*, according to Vitruvius, Wherein is diſcourſed of the five Orders of Columns, *viz.* The *Tuſcan*, *Dorick*, *Ionick*, *Corinthian*, and *Compoſite*. Divided into ſeven Chapters. Which declare their different Proportions, Meaſures and proper names, according to the Practice of the ancient *Architects*, both *Greeks* and *Romans*; As alſo of their parts general and particular, neceſſary in building of Temples, Churches, Palaces, Caſtles, Fortreſſes, and all other Buildings with their Dependents: As Gates, Arches Triumphant, Fountains, Sepulchres, Chimneys, Croſs-bard windows, Portals, Platforms, and other Ornaments; ſerving as well for the beautifying of Buildings in Cities, as for neceſſary Fortifications of them: deſigned by *Julian Mauclerc* Lord of *Ligneron Mauclerc Broſſandiere* and *Remanguis*. Whereunto are added the ſeveral meaſures and proportions of the famous Architects, *Scamozzi*, *Palladio*, and *Vignola*: with ſome rules of Perſpective. The whole repreſented in fifty large Prints, enriched with the rareſt Ornaments of Antiquity, and Capitals of extraordinary greatneſs, with their Architraves, Frieſes, and Cornithes proportionable. Large fol. price bound 12 s.

A New Book of Architecture, wherin is repreſented forty figures of Gates and Arches triumphant Compoſed of different Inventions, according to the Five Orders of Columns. *viz.* The *Tuſcan*, *Dorick*, *Ionick*, *Corinthian* and *Compoſite*. By *Alexander Francine* Florentine. Engineer in Ordinary to the French King: With a Deſcription of each Figure. Large fol. bound 10 s.

The Art of *Fair Building*: Repreſented in ſeveral Uprights of Houſes, with their Ground-plots, fitting for perſons of ſeveral Qualities. Wherein is divided

vided each Room and Office according to their most convenient occasion, with their Heights, Depths, Lengths, and Bredths according to Proportion, With Rules and Directions for the placing of doors, windows, Chimneys, Beds, Stairs, and other conveniences: with their just measures for their best advantage, both of Commodiousness, Health, Strength and Ornament. Also a Description of the Names and Proportions of the Members belonging to the framing of the Timber-work, with Directions and Examples for the placing of them. *By Pierre le-Muet*, Architect in Ordinary to the French King and Surveyor of his designes and Fortifications in the Province of *Picardy*. Large fol. price bound 8 s.

A Book of *Architect*, containing Cieling-pieces, Chimney-pieces, and several sorts useful for Carpenters, Joyners, Carvers, painters, invented by *J. Barbet*.

Gethings Redivivus, or the *Pens Master-Piece*. Being the last Work of that eminent and accomplished Masters in this *Art*. Containing Examples of all curious Hands written, and now in practice in *England*, and the neighboring Nations: With necessary Rules and Directions towards the attaining of Fair Writing, &c. Fol. price stitcht 1 s. 6 d.

An Excellent Introduction to Architecture, being a book of *Geometrical Practice*: which is the first degree of all *Arts*: Wherein is contained Variety of Examples of that admirable Science, Shewing and describing the making of several Figures in that Nature, with the proper Names belonging to each Member and Figure, and how to begin and end them after a plain and easie manner, it being of great use to all artists and Workmen concerned in building: More especially, *Surveyors, Architects, Engineers, Masons, Carpenters, Joyners, Bricklayers, Plaisterers, Painters, Carvers, Glasiers, &c.* In General, for all that are concerned to delight to practise with the Rule and Compass. 4to. price bound 2 s.